The Chemical Age

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NOTICES:—All communications relating to editorial matter should be addressed to the Editor, who will be pleased to consider articles or contributions dealing with modern chemical developments or suggestions bearing upon the advancement of the chemical industry in this country. Communications relating to advertisements or general matters should be addressed to the Manager.

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"The Chemical Age" Index

Copies of the Index to Vol. 4 (Jan.—June, 1921) will be ready shortly. Applications should be made at once to the Circulation Manager, "The Chemical Age," 8, Bouverie Street, London, E.C.4.

"Famous Chemists"

SIR WILLIAM TILDEN'S volume on "Famous Chemists" (G. Routledge & Sons, pp. 296, 12s. 6d.), which we have dallied perhaps too long in noticing, is just the kind of work one might expect from its distinguished author. That it is throughout scholarly and sincere hardly needs to be said; in the handling of facts and events an encyclopædic range of knowledge is united to a lucid and unpretentious style which perfectly serves the purposes of description and exposition; finally, with just the right air of detachment the author picks out his selected figures and so deals with their work and times and personality as to make them living milestones in the march of chemical science. The difficulty of selecting the right men has been solved by the adoption, as a guiding principle, of the evolution of the atomic theory from the point of view of the chemist. "Present views of the constitution of matter," Sir William Tilden explains, "have resulted from the establishment, step by step, of the idea of the chemical element, the isolation of the chief elements, the establishment of the quantitative laws of chemical combination, the application of the atomic doctrine to the explanation of chemical phenomena, the application of the idea of valency to the constitution and structure of the molecule and the study of the properties of atoms. It is the men who have taken the leading part in each step forward along this line whose story is told." Anticipating the inevitable comment on the absence of chemists with high claims from a group which had to be remorselessly restricted, Sir William simply states that they have not been included "because their researches led to results which were contributory but not essential to the establishment of the atomic doctrine."

Altogether twenty-one "famous chemists" have been selected, and a glance at the names alone—beginning with Robert Boyle and ending with Crookes and Ramsay—indicates the honourable part which this country has taken in the advance of chemical science. In between these we have Black, Priestley, Cavendish, Davy, Dalton, Faraday, Frankland and Williamson. France is represented by Lavoisier, Gay-Lussac, Proust and Dumas, Germany by Liebig, Sweden by Scheele and Berzelius, Italy by Avogadro and Cannizzaro, and Russia by Mendeléeff. Vastly differing in type and circumstances, these men were all one in their absolute devotion to science or to that corner of it in which their studies were concentrated. One gains the impression that they could no more have failed to do what they did or at least to have worked as they did towards it than a great writer or poet could remain silent. Their researches were to them always a vocation in which all their powers were unreservedly spent, and exterior rewards and honours fell into a secondary place. It is worth remembering in times more frankly materialist in spirit, and Labour perhaps more than any class just now might learn from the story of these fine lives civilisation's debt to other classes of workers than its own. Nor can one find much support for the view that science and the humanities sort ill together. For the limits of the laboratory could no more exclude religion from the minds of Boyle and Priestley and others than it could deprive Davy of the delights of verse.

The volume, into which a vast amount of work and matter is compressed, comes to a close on a fine note in the epilogue. Here the author touches lightly on new developments and starting points, and hints at a far distant vision of future triumphs. "Though, in the opinion of the writer," he says in the closing words, "it is improbable that the origin of life and of the difference between living and dead matter will ever be finally determined, the conditions of life for the human race will be so far improved that its term will be extended generally beyond the hundred years now thought to be almost miraculous." That passage alone might well stand as the refutation of the view that the qualities of the true disciple of science are incompatible with soul and imagination.

Are We Penalising Research?

ATTENTION has been drawn in more than one way during the week to the question whether, in seeking to protect certain of our nascent industries from foreign competition, we are penalising research in this country. It is a little difficult to balance the arguments until the facts are known on which they are based, but there can be no doubt that people interested in research are seriously concerned. Concern has been expressed in particular respecting the restriction on the importation of chemical dyes used in bacteriological work. It is know that certain microbes can be discovered and identified by their predisposition to absorb certain colours. It is obvious that in such investigations the purity and standardisation of the reagents employed must be beyond suspicion, for variation and impurity might lead the investigator seriously astray. Here the Germans have specialised with their usual thoroughness, and if instead of the thoroughly dependable German colours we have to put up with others not of the required standard there is a good case for letting the German colours in until we can produce our own of an equal quality.

It is quite possible to make too much of such a case, considered in isolation; but among research, analytical and consulting chemists one hears some savage things said occasionally about the quality and the price of British fine chemicals compared with those formerly obtainable from Germany. About the main fact there can be no dispute. We are not the equal of Germany in fine chemicals. The point is whether we are to accept our inferiority as final, or make an effort to overcome it. Something has been done in the latter direction as regards research chemicals at least, and the work of the Association of British Chemical Manufacturers deserves recognition. What might be of advantage would be a frank disclosure of their present position from those who use fine chemicals and find our British supplies unsatisfactory, either in price or in quality. Quality is absolutely essential; price may be temporarily accommodated to special conditions, but ultimately that also must be on an equality with competitors' figures if trade is to be retained. There is always one great incentive to the support of our own chemical industries. If the dyestuffs and the fine chemical industries go to Germany or other nations, the chemists will go with them. Where should we be, once our chemical staffs were disbanded, in the event of an emergency calling for trained men? And where will the professors get their research students from if the industries most requiring research migrate elsewhere?

Instead of grumbling in secret, it would be preferable if all interested in so vital a problem would speak out. One notably frank utterance comes from Professor H. E. Armstrong, which, though it may be regarded as a little dogmatic, has the merit of putting the case forcibly from a very definite point of view. The schedule of goods chargeable with duty under the Safeguarding of Industries Bill includes, he states, practically everything required by workers in experimental science, and by teachers of experimental science in schools and universities. "Education and scientific inquiry," he writes, "will therefore be most seriously penalised should the Bill be passed. Prices will be greatly raised against the British consumer, and he will often be obliged to put up with inferior quality, if he use only articles of British make; and when he is forced to procure anything from abroad, either because it is not to be had here or because the quality is unsatisfactory, the delays will be intolerable. There will be endless bureaucratic interference." Having mildly suggested some changes in the Board of Trade's attitude ourselves, we will spare the feelings of that department by not quoting Professor Armstrong on the subject.

Dye Industry and National Welfare

IT is a matter of common knowledge that the strenuous endeavours made in this country and America to establish a synthetic dye industry on a scale sufficient to meet native demands have not met with the success which was promised at the inception of the schemes. The recent report of the British Dyestuffs Corporation speaks for itself, while one of our contributors, lately returned from America, has a sorry tale to tell of conditions over there. In America, however, there is no lack of appreciation of the important bearing which a national dye industry has upon the welfare and security of a country; and, perhaps, the case has never been better presented than by Dr. Marston Bogert, Professor of Organic Chemistry at Columbia University.

Speaking recently at a meeting of the Franklin Institute, Professor Bogert remarked that in world commerce, as in world war, there is but one method of attack, and that is with an organization of a size and power commensurate with the undertaking. Grave danger lies in our failure to apprehend the deadly character of the German menace, and in the short-sighted opposition of those textile manufacturers who cannot see that it is to their own advantage to foster and encourage a native dye industry. Professor Bogert in reviewing the immediate consequences (some of which have already made their appearance) of the curtailment or abandonment of the new dye industries shows first of all that large numbers of specially trained technical experts will be forced to seek other means of livelihood with the consequent economic loss involved in scrapping the experience gained in connexion with dyes. Amongst other consequences must be included (*a*) the abandonment by manufacturers of all plans for development and expansion, (*b*) fewer students for courses in chemistry at the universities, (*c*) termination or reduction of valuable research work both in laboratories and on works, and (*d*) the inability of teachers of applied organic chemistry to give their students up-to-date information through loss of personal contact with the manufacturer. Domination of the trade in dyes and intermediates by Germany is certain to lead to the control of other industries, apart from the fact that the textile and other industries must be subjugated by foreign manufacturers.

As chemical warfare was responsible for nearly a third of all casualties in the war, and as this proportion is quite certain to be higher in future conflicts, it is idle to talk about disarmament without including the munition plants represented by Germany's great dye industry and nitrogen-fixation units. Because of the role which these play in the economic life of the

nation at peace, they cannot be destroyed without destroying Germany as well. Where disarmament is impossible, there is but one answer—counterbalancing armament. Hence, the one sane and practicable disarmament which we can really accomplish is an equivalent or superior development of our own dye and air-nitrogen industries. It is the most effective guarantee of peace, and in the long run much the cheapest form of insurance.

Mr. Calvert's Potash Process

In our last issue some particulars were given of the process for producing alcohols from water gas which has been introduced by Mr. G. C. Calvert, of Twickenham Park. It will be remembered that when this process was first made known some three or four months ago it attracted a considerable attention, particularly in view of the fact that the salient principles were not revealed. At the time, we ventured to suggest the probable *rationale* of Mr. Calvert's method, and as yet the inventor has neither confirmed nor disclaimed our suggestions. The article published last week does not carry the matter much further, for all we are told is that a mixture of water gas and other gases (according to the product desired) is passed through an apparatus, "details of which cannot yet be published." It is said, however, that in the case of methyl alcohol a yield of 80 per cent. of the theoretical maximum is obtained.

In so important an invention the need for secrecy in the earlier stages is obvious, but we trust that we may soon be privileged to know the details.

Mr. Calvert, it may be recalled, has also developed a scheme for the utilisation of sudd from the river Nile. About one ton of this substance contains about 20 per cent. of the thermal energy of a ton of coal, together with about 45 lb. of potassium salts. The suggestion is to treat the sudd in a producer gas plant. The gas would drive a gas engine and dynamo, and the current generated would be used to electrolyse the potash salts obtained by lixiviation of the ashes for the production of hydroxide, or to make nitric acid from the air, the acid then being allowed to react with the salts for the formation of nitrate. In another process Mr. Calvert burns the sudd to charcoal in an oven heated by the sudd, and uses this charcoal for the manufacture of cyanide, from which he would obtain nitric acid, via ammonia, which again could be combined with the potash salts to form nitrates. It is stated that this sudd charcoal is free from sulphur, and that with it, owing partly to its physical position and partly to the contained alkali, the reactions proceed rapidly at much more economical temperatures than with coal or coke, which require high temperatures.

Bon Voyage

Yesterday by the morning train from Euston the official party representing the Society of Chemical Industry left for the Annual Meeting in Canada. It was not as large a party as it would have been had the circumstances of trade and other considerations been more propitious, but in quality it will probably equal any test to which it is likely to be subjected, and those who compose it may count on a pleasant and profitable tour of about six weeks. The members are timed to arrive at Montreal during Friday and Saturday, August 26-27. Sunday will be spent in golf and a motor trip—unless the devout tendencies of the visitors incline them elsewhere. Monday, Tuesday and Wednesday will be occupied with meetings, receptions, luncheons and banquets. The following five days will be spent in visits to Shawinigan, Ottawa, Toronto and Niagara. On Wednesday, September 7, the party hope to reach New York, and the following two days will be given up to the meetings of the American Chemical Society. The attractions for the week-end are "golf and tea" and "boat trip and tea"—both of which sound a little risky. The last week, September 12 to September 18, will be occupied with the National Exposition of Chemical Industries. By the end of September most of the members are expected back, and their impressions of the visit will be awaited with interest.

Better Trade Returns

The Board of Trade returns at last show a turn for the better, which it is to be hoped means the beginning of a steady and sound improvement. The returns for July show a recovery in exports from the low point touched in June, when the effects of the coal stoppage were most pronounced. British exports amounted to £43,172,000, compared with £38,152,200, and re-exports to £9,361,000, against £7,083,000. There was, however, a further shrinkage in imports, the total being £80,757,000, against £88,182,000. Compared with July, 1920, imports show a fall of 82¼ million pounds, and British exports a fall of 94¼ millions. Lower prices, however, account for a large part of the decrease.

The Calendar

Aug. 13	Mining Institute of Scotland: General Meeting: Papers by H. M. Cadell, Professor Briggs, W. McNaughts, D. Penman. 3 p.m.	Royal Technical College, George-st., Glasgow.
29	Society of Chemical Industry: Annual General Meeting. 11 a.m.	McGill University, Montreal, Canada.
Sept. 7-14	British Association for the Advancement of Science: 89th Annual Meeting: "Some Aspects and Problems of Post-war Science, Pure and Applied," by Sir Edward Thorpe, the President.	Edinburgh.
21–23	Institute of Metals: Annual Meeting.	Birmingham.
28	Faraday Society: "Catalysis—with Special Reference to Newer Theories of Chemical Action." General Discussion.	—
Sep. 19–Oct. 29	Royal Photographic Society of Great Britain: 66th Annual Exhibition.	35, Russell Square, London.
Oct. 7	Society of Chemical Industry: Annual Dinner.	Connaught Rooms, Kingsway, London.

Books Received

Tests on Volumetric Glassware used in Dairy Chemistry. The National Physical Laboratory. Pp. 14. 6d.

Organic Compounds of Mercury. By Frank C. Whitmore. New York: The Chemical Catalog Co., Inc., pp. 397. $4.50.

Heat Required in Acid Concentration

By F. Colin Sutton

The writer brings out some facts in connection with the concentration of sulphuric acid from 65 per cent. to 95 per cent. which are not generally understood. The article is based on a paper by Dr. Kneitsch.

THE heat required to concentrate sulphuric acid can be divided into three main heads :—

1. The heat required for actual volatilisation of the water to be driven off.

2. The heat required to overcome the affinity or attraction existing between the sulphuric acid and the water.

3. The amount required as sensible heat—*i.e.*, to raise the temperature of the mixture to the point at which water is driven off.

In addition to these factors a further factor enters as the strength of the acid increases beyond 80 per cent. H_2SO_4; this is due to the volatilisation of the sulphuric acid itself and to partial dissociation of the H_2SO_4 molecules into H_2O and SO_3.

The amount of heat required under the three headings given above can be determined as follows :—

1. Heat required for volatilisation of the water to be removed. This is obtained by multiplying the weight of water to be driven off by the latent heat of vaporisation of water, viz., 537 gram-calories. The amount of water to be removed at successive stages of the concentration are estimated from the theoretical amount of water and sulphuric acid present, assuming that no loss of H_2SO_4 occurs in concentrating from 65 to 100 per cent.

2. The heat required for overcoming the affinity existing between sulphuric acid and water is estimated from the known values of the heat of dilution of sulphuric acid at various strengths. For this purpose Curve No. 1 has been constructed on the data of Thomson. This curve shows the heat evolved in calories when 95 grams of H_2SO_4 are diluted by successive additions of water to the strengths shown on the abscissæ. The amount of heat given out on diluting 100 grams of acid from 95 to 65 per cent. strength is shown by the curve to be 6,600 calories. This will obviously be the amount of heat required to overcome the affinity existing between the sulphuric acid and the water in concentrating over this range.

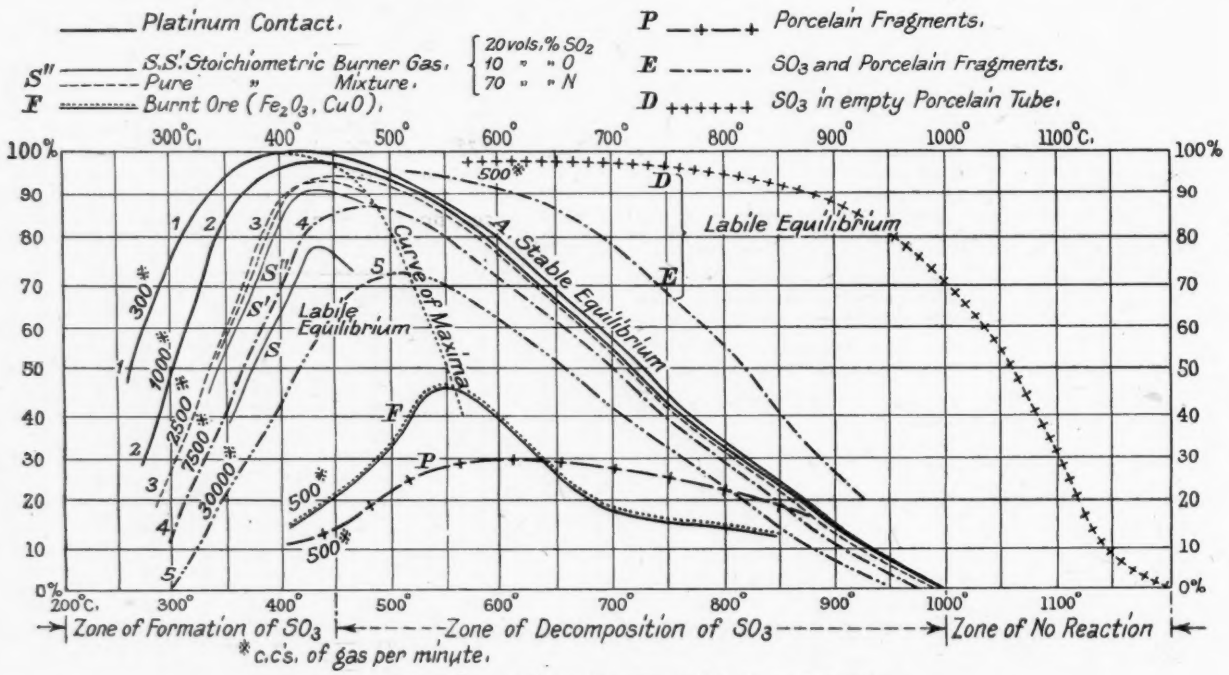
Table No. I. shows the successive amounts of heat required for overcoming this affinity, when 146·1 grams of 65 per cent. acid are concentrated successively to 70, 75, 80 per cent., and so on up to 100 per cent. strength ; the amount of 95 per cent. acid obtained would be 100 grams.

This table has been drawn up from Curve No. 1.

TABLE NO. I.

Heat required for overcoming affinity between H_2SO_4 and H_2O, concentrating 146·1 grams of 65 per cent. and to 95 grams H_2SO_4.

Strength of acid. Per cent. H_2SO_4.	Heat required Calories.
65 per cent.	—
70 ,,	800
75 ,,	1,750
80 ,,	2,750
85 ,,	3,850
90 ,,	5,100
95 ,,	6,600
100 ,,	10,600


Platinum Contact.
S, S', Stoichiometric Burner Gas.
S'' Pure " Mixture.
F Burnt Ore (Fe_2O_3, CuO).
20 vols. % SO_2
10 " " O
70 " " N
P Porcelain Fragments.
E SO_3 and Porcelain Fragments.
D SO_3 in empty Porcelain Tube.
Labile Equilibrium
A. Stable Equilibrium
Curve of Maxima
Zone of Formation of SO_3
Zone of Decomposition of SO_3
Zone of No Reaction
* c.c's. of gas per minute.

Course of Reaction $2SO_2 + O_2 \rightleftharpoons 2SO_3 + 22{,}600$ cals.
% Conversion (for certain fixed rates of Gas Flow) plotted against Temperature.
Fig. 1.

3. Heat required as sensible heat to raise the temperature of the acid during concentration.

In order to arrive at this amount of heat we require to know :
(*a*) The boiling points of sulphuric acid at various strengths ;
(*b*) The specific heats of sulphuric acid at various strengths.

These two variants are shown by curves Nos. 2 and 3 respectively. From them the amount of heat required as sensible heat has been calculated in the following way : To concentrate 146·1 parts of 65 per cent. acid to 135·6 parts of 70 per cent. acid, the weight 146·1 has been multiplied by 0·475, the specific heat of 65 per cent. acid, and by the temperature interval of 145 deg. The boiling point of 70 per cent. acid has been shown from the curve to be 160 deg., an

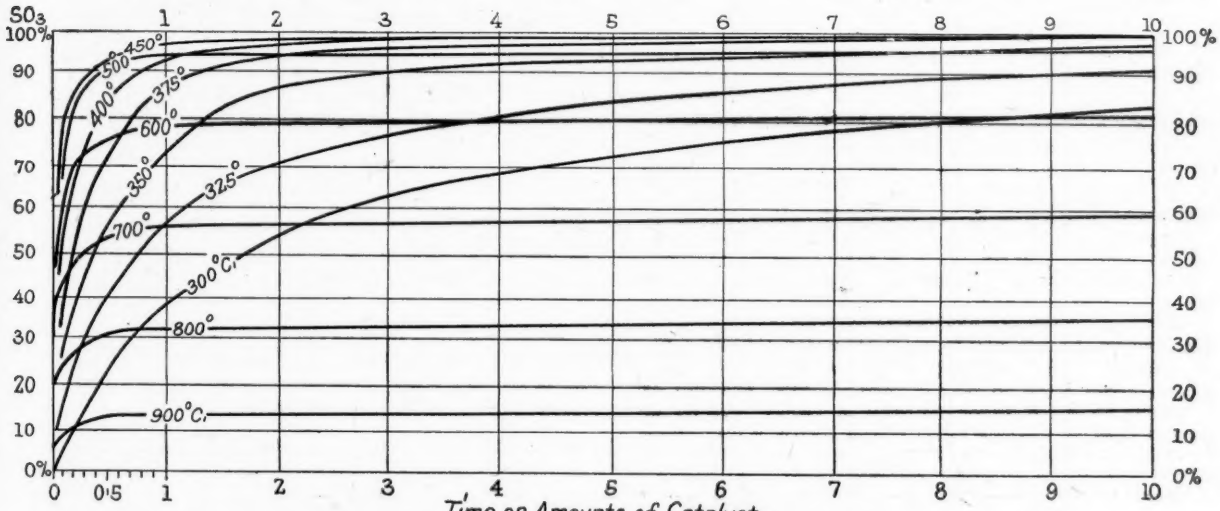
initial temperature of 15°C. being assumed. In going from 70 to 75 per cent. strength the heat required as sensible heat has been calculated by multiplying the weight of 70 per cent. acid—viz., 135·6 grams—by the specific heat at that concentration—viz., 0·45—and by the temperature interval between the boiling points, 70 and 75 per cent. acid. The amount so calculated added to the sensible heat required to bring the 65 per cent. acid to 70 per cent. strength gives the sensible heat required in raising 146 grams of 65 per cent. acid at 15°C. to a strength of 75 per cent. at the boiling point. The heats required as sensible heat in arriving successively at 80, 85 and so on up to 100 per cent., have been calculated in exactly the same way.

Table II. shows the figures by which the amounts of sensible heat have been arrived at.

This method of calculating the increments of sensible heat is not of course, entirely accurate; it serves, however, to give an approximation to the true figures, which could only be obtained by the use of the calculus.

TABLE No. III.

Weight of Acid. Grams.	Strength per cent H_2SO_4	Water to be removed. Grams.	For Volatilisation.	Heat required for overcoming Affinity.	Calories as sensible Heat.	Total.
146·1	65	—	—	—	—	—
135·6	70	10·5	5,640	800	10,070	16,510
125·6	75	19·5	10,470	1,750	11,050	23,270
118·7	80	27·8	14,930	2,750	12,110	29,790
111·7	85	34·4	18,470	3,850	13,160	35,480
105·5	90	40·5	21,730	5,100	14,250	41,080
100·0	95	46·1	24,750	6,600	15,540	46,890
95·0	100	51·1	27,460	10,460	16,710	54,770



Isothermal Curve of Reaction $2SO_2 + O_2 \rightleftharpoons 2SO_3$.
% Conversion plotted (for certain fixed Temperatures) against Time, or against varying Amounts of Catalyst. Initial % SO_2 = 7·0.
Fig. 2.

TABLE No. II.

To raise from 65 per cent. to 70 per cent. at 160° requires 146·1 × 0·475 × 145—10,070 *calories.*

Weight of Acid. Grams.	Strength per cent H_2SO_4	Boiling Point, °C.	Specific Heat.	Temperature interval, °C.	Heat added for interval of concentration. Calories.	Total sensible heat. Calories.
146·1	65	145	—	—	—	—
135·6	70	160	0·475	15	—	10,070
126·6	75	176	0·45	16	980	11,050
118·7	80	196	0·42	20	1060	12,110
111·7	85	218	0·40	22	1050	13,160
105·5	90	244	0·375	26	1090	14,250
100·0	95	279	0·35	35	1290	15,540
95·0	100	—	0·325	36	1170	16,710

Curve No. 4 has been drawn up from Table No. III., which shows the total amount of heat required under the three headings:—

(1) Heat required for volatilisation of water.
(2) Heat required for overcoming affinity; and
(3) Sensible heat required.

This table shows the amounts of heat required to produce successively acid of 70 per cent., 75 per cent., and so on up to 100 per cent. strength, starting from 146·1 grams of 65 per cent. acid at 15°C. and assuming no loss of H_2SO_4 occurs.

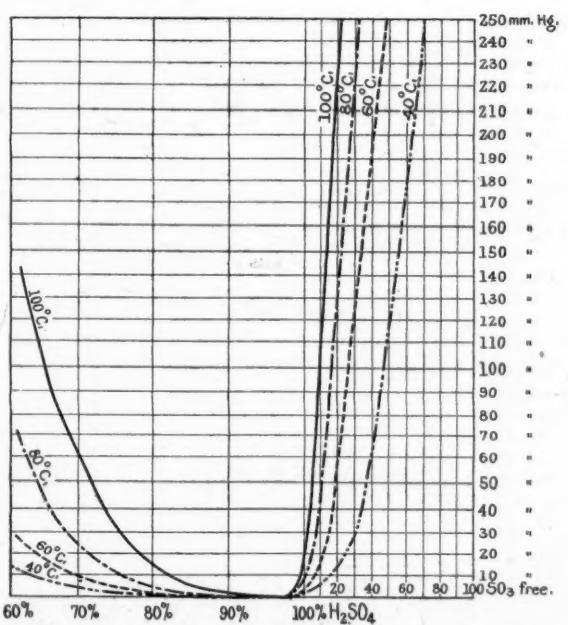


Fig. 3. Vapour Pressure of Sulphuric Acid and Oleum.

Tower Concentration from 65 to 95 per cent.

Table No. III. gives the heat required to concentrate 146·1 grams of 65 per cent. acid to 100 grams of 95 per cent. acid to be 46,890 gram-calories; therefore to produce 1 gram of 95 per cent. acid requires 468·9 calories.

To produce one ton of 95 per cent. acid requires

$$468{\cdot}9 \times 2240 \times 1{\cdot}8 \text{ B.T.U.}$$
$$= 1{,}890{,}000 \text{ B.T.U.}$$
$$= 1{\cdot}89 \times 10^6 \text{ B.T.U.}$$

The quantity of heat reckoned on this basis takes no account of heat required for volatilisation and partial dissociation of H_2SO_4 for radiation loss, &c. It may be safely assumed that an addition of 20 per cent. will more than cover all loss under these heads. This gives us:

To produce one ton of 95 per cent. acid from 65 per cent. acid requires

$$1{\cdot}2 \times 1{\cdot}89 \times 10^6 \text{ B.T.U.}$$
$$= 2{\cdot}27 \times 10^6 \text{ B.T.U.}$$

One ton of coal may be assumed to yield in the producers 150,000 cubic feet of gas measured at normal temperature and pressure. Assuming 1 cubic foot of gas at N.T.P. to yield on combustion 135 B.T.U. one ton of coal burned in a producer should give gas capable of developing

$$135 \times 150{,}000 \text{ B.T.U.}$$
$$= 2{\cdot}02 \times 10^7 \text{ B.T.U.}$$

On this basis one ton of 95 per cent. acid produced from 65 per cent. acid will require

$$\frac{2{\cdot}27 \times 10^6}{2{\cdot}02 \times 10^7} = 0{\cdot}112 \text{ tons coal.}$$

$$= 16{,}800 \text{ cubic feet gas at N.T.P.}$$

No account is taken here of the temperature at which the gas enters and leaves the tower. It may be considered that gas enters the tower at 300° C., and that the products of combustion leave the top of the tower at 250°C. The steam produced from the acid has already been heated to the boiling temperature of the acid by the sensible heat taken into account

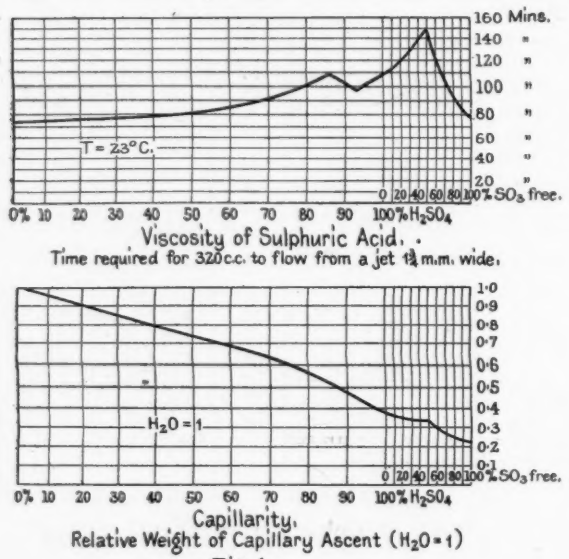


Fig. 4.

in Table No. II., and therefore the only factor for which correction has not been made is the heat required to raise to 250° C. the volume of air required for combustion. This amount may safely be reckoned as covered by the 20 per cent. allowance for loss.

To produce 40 tons of 95 per cent. acid per day requires $40 \times 16{,}800$ cubic feet of gas at N.T.P. per 24 hours, *i.e.*, 7·8 cubic feet of gas at N.T.P. per second; *i.e.*, approximately 15·0 cubic feet of gas at 250° C. and atmospheric pressure per second.

Volume of Gas and Air to be Considered

Assuming 100 volumes of the gas to contain 25 per cent. carbon monoxide, 11 per cent. hydrogen, 3 per cent. methane, 6 per cent. carbon dioxide, and 55 per cent. nitrogen, the air required for complete combustion will be 120 volumes, and the volume of the products of combustion will be 202; hence the volume of air required to produce 40 tons of 95 per cent. acid daily will be 806,000 cubic feet at N.T.P. per 24 hours, *i.e.*, 9·4 cubic feet at N.T.P. per second; hence volumes required per second at 250° C. and atmospheric pressure will

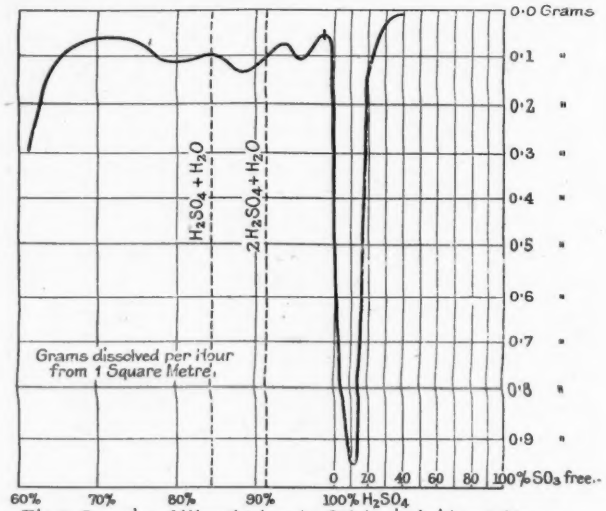


Fig. 5. Corrosion of Wrought Iron by Sulphuric Acid and Oleum.

be: of gas 15 cubic feet, and of air 18 cubic feet per second, and of the products of combustion 30 cubic feet at 250°C. and atmospheric pressure per second.

Volume of Water Vapour to be Considered

To concentrate 40 tons of 95 per cent. acid per day requires the volatilisation of 18·4 tons of steam per 24 hours. Assuming 1 lb. of steam at 100° C. and atmospheric pressure to occupy 26·43 cubic feet, we have that 18·4 tons at 250° C. and atmospheric pressure will occupy $2{\cdot}09 \times 10^6$ cubic feet, equivalent to 24 cubic feet per second, hence we have to discharge from the top of the tower 54 cubic feet of a mixture of steam, nitrogen and products of combustion at a temperature of 250° C. and at atmospheric pressure per second. This requires, for a 9 foot diameter tower, a velocity of 0·86 feet per second.

North of England Mining Engineers

THE annual general meeting of the members of the North of England Institute of Mining and Mechanical Engineers was held in the Wood Memorial Hall, Newcastle, on August 16, Lt.-Col. F. R. Simpson, the retiring president, in the chair. The annual report showed an increase of 62 members for the year. Mr. Reginald Guthrie, the treasurer, stated that the total receipts for the year amounted to £4,214, and there was a net balance of £1,346, largely due to increased subscriptions.

Colonel Simpson, in his retiring presidential address, said that great benefit had resulted from the establishment of a students' associate society, and he urged the Council to stimulate the interest of the younger members who would be responsible for the future successful conduct of the mines. Mr. M. W. Parrington had retired from the post of honorary secretary, and the Council had elected Dr. Henry Louis as his successor. Another change was the decision of the Council to join with the Institute of Mining and Metallurgy for the purpose of accommodation in London, and for more efficient management of the two bodies by the appointment of a joint secretary. The arrangement would in no way affect the individuality of the respective institutes.

Mr. C. C. Leach was elected president in succession to Colonel Simpson.

Reviews

PHYSICAL CHEMISTRY FOR COLLEGES. By E. B. Millard. McGraw-Hill Book Co., Inc., 1921. Pp. 411 ; 21s.

This text, in the International Chemical Series, provides for a first year course in physical chemistry suitable for college or pass-degree students. It is developed on a logical plan, an introductory chapter, dealing with laws and theories, being followed by chapters on the three states of matter—gaseous, liquid and solid. There follow chapters on solutions, ionisation, thermo-chemistry and equilibria, homogeneous and heterogeneous. Chapters on reaction kinetics and on physical properties and molecular structure lead up to a discussion of elements, their classification, radiochemistry and atomic structure. This discussion is thoroughly up to date, and contains summaries of such recent work as the Lewis-Langmuir theory, Sir E. Rutherford's work on the bombardment of nitrogen molecules with alpha particles, and Astor's work on isotopes. The book is completed by chapters on colloids or surface chemistry and on electro-chemistry.

The author has made an especial feature of tabulated data, generally from modern researches, in illustration of the quantitative side of physical chemistry. With these data, problems may be assigned from the text, thus leaving to the student the task of selecting the requisite material for the solution of the problem. This important pedagogical advantage has, however, been attained only at the sacrifice of the historical development of the science. It is curious to read a useful text such as this without once meeting the names of van't Hoff and Ostwald and finding Arrhenius mentioned only for two relatively unimportant researches published in 1918. The reviewer feels that the perspective of the subject has been needlessly sacrificed. Future editions could easily be made to supply this.

Most of the material is excellent and criticism may easily be but an expression of personal preferences. One might venture a wish that other methods of vapour density determinations had been suggested. The constant volume method has a very definite instructional value in familiarising the student with the fundamental gas laws. In the discussion of deviations from such laws, also, there must surely be place for dissociation phenomena as, for example, in the case of phosphorous pentachloride vapour. In this volume such matters and the law of mass action are not treated before Chapter VIII. and page 215. They could readily have been introduced in Chapter II.

To the editor and publishers of the International Chemical Series it may be observed that this book and Professor Washburn's book overlap considerably, and that even the two together do not cover adequately the ground which should be covered by the student of chemistry who wishes to go out from his student life as powerfully equipped on the theoretical side as the rapidly developing science demands.

HUGH S. TAYLOR.

Thanks from Washington

To the Editor of THE CHEMICAL AGE

SIR,—I desire to express my appreciation and also that of the other members of the Bureau of Mines involved of your very cordial and complimentary notice of some of our work on page 664 of your issue of Saturday, June 11, 1921.

Any recognition of the work of the Bureau is always appreciated. We are always glad to know that the work we are doing has a practical application and is of real benefit to some industry.—Yours, &c.

R. B. MOORE,
Chief Chemist.

Department of the Interior,
Bureau of Mines,
Washington.
July 22.

[We are glad to have been of use in making the admirable work of this Department better known among British chemists, and the numerous inquiries received indicate the extent to which that work is appreciated.—ED., *C.A.*]

Science and Key Industries

Professor Armstrong Condemns the Bill

PROFESSOR ARMSTRONG contributes to the *Manchester Guardian* a vigorous protest against the Safeguarding of Industries Bill on the ground that it will penalise science.

"The schedule of goods," he writes, "chargeable with duty is a most alarming one ; it includes practically everything required by workers in experimental science and by teachers of experimental science in schools and universities. Education and scientific inquiry will, therefore, be most seriously penalised should the Bill be passed. Prices will be greatly raised against the British consumer, and he will often be obliged to put up with inferior quality, if he use only articles of British make ; and when he is forced to procure anything from abroad, either because it is not to be had here or because the quality is unsatisfactory, the delays will be intolerable. There will be endless bureaucratic interference.

"The 'precision balance' used in accurate weighing is an instance. There has long been a maker here of the very highest repute, and whenever we could afford to do so English users have preferred to buy from him ; but there has never been a satisfactory maker of a moderate-priced article suitable for general use. Schools and colleges have been supplied from Germany. Again, take the polariscope, an instrument of great value which is now widely used ; it has never been procurable here. It may be that some makers of hard glassware produce an article equal if not superior to the German product, but the output is insufficient and the price prohibitive. Good porcelain, which can be safely used, is not made here.

"The Bill cannot well have the effect that is desired. Our inability to manufacture many of the articles scheduled in sufficient quantity, of good quality, and at a reasonable cost will not be overcome in five years. A generation of capable workers must grow up before we shall be able to compete with the established foreign makers ; also the right spirit has to be infused into manufacturers. In Germany, maker has always done his best to meet user ; here the maker too often says : 'Take this I offer or leave it' ; he will not go out of his way to meet requirements. Our great need is still a proper interfusion of science and industry ; the English commercial mind, at present, is incapable of going outside commerce.

"Our inability to make optical glass is often referred to : as a matter of fact, we have always been makers of glass of the highest quality ; we have failed because we have not developed the business organisation required for the manufacture of the instruments in which such glass is used. Throughout, as in the case of dyestuffs, our failure has been on the business side, not on the technical.

"The fine chemical industry, which is one of those asking for protection, has done nothing to organise itself, within its own boundaries ; the Germans, we know, are working in closest alliance.

"The Board of Trade through its ineptitude has hitherto prevented the advance of the dyestuff industry ; it will similarly hamper the advance of the industries scheduled in the proposed Bill should this be made law. It is known that the Dyestuffs Protection Act is a failure and that it is holding up our textile trade. The recent appointment of a committee to develop the industry is a farce. Surely we are not so decadent that we are unable to learn any of the many lessons that the war should have taught us."

Passage of United States Tariff Bill

A WASHINGTON message states that the Fordney Tariff Bill has been passed by 289 votes to 127, but the dyestuff licensing portion of the Bill was defeated by 208 to 193 and was therefore withdrawn. Various amendments were made raising the dutiable rate on citrate of lime from 2½ to 7 cents per lb. ; quicksilver from 7 to 25 cents per lb. ; and citric acid from 10 to 12 cents per lb. The House imposed a new duty of 10 cents per lb. on bromine and all bromine compounds not specially provided for and decreased the rate on tanning extracts from 12½ to 11 per cent. *ad valorem*. The rates on crude and synthetic camphor were changed from 25 per cent. *ad valorem* to 1 cent. per lb. on crude and 6 cents on synthetic camphor.

Petroleum Specifications

Standardisation in the United States

THE U.S.A. Technical Committee on Standardisation of Petroleum Specifications at a recent meeting in the Interior Department Building, Washington, D.C., took into consideration a number of proposed changes in the text of Bulletin 5 of the Committee, which contains the specifications used by the Federal Government for the purchase of gasoline, kerosene, fuel and lubricating oils. There were present at the meeting representatives of the various Governmental agencies interested in the purchase of petroleum products and members of the technical staffs of various refining companies. Mr. N. A. C. Smith, Petroleum Chemist of the Bureau of Mines, and Chairman of the Technical Committee, presided.

The Committee first discussed the proposition of adopting a number of new methods for testing various petroleum products which have recently been sanctioned by the American Society for Testing Materials. These relate to the following tests: corrosion; flash; distillation; sulphur; cloud and pour; saponification in place of fatty oil; water and sediment; precipitation; viscosity "Furol"; and melting point. The general sentiment of the meeting was that the new A.S.T.M. methods should be adopted, though it was pointed out that the new methods were still in the tentative stage, and that the Committee would do well to give careful study to each method before adopting it. Considerable discussion arose over the proper application of the saponification number of fatty oils. It was suggested that the present method was not applicable to sperm oil on account of its low saponification value. Methods to overcome this difficulty were discussed, and the suggestion was made that the manufacturers be required to submit sworn statements as to the kind of ,oil used in compounding.

The possibility of omitting certain tests now employed was discussed, and the conclusion was reached that the acid heat test for gasoline and the cold test for steam cylinder and black oils were unnecessary. It was brought out, however, that the fire test for lubricants was of value as a check on sampling and should be continued in the specifications.

The only other change in testing methods discussed was the proper temperature for making emulsion tests, and it was agreed that on oils of high viscosity a high temperature should be employed. Actual details of viscosity and temperature were left to the further consideration of the Committee.

It was agreed that some changes in the arrangement of Bulletin 5 would be more convenient, and that it would be a good plan to give each testing method an identification number. The proposition to include an interpretation of each test was objected to, however, as tending to relax the strictness of the specifications.

Considerable discussion arose over the distillation range of motor gasoline. It was suggested that the present 90 per cent. point should be raised slightly. On the other hand, it was argued that the specification should be retained unchanged until such time as an entirely new grade of gasoline can be used. It was said that experimental work now in progress would probably afford more information as to the correct range for motor gasoline. More definite colour standards and a corrosion test for gasoline were also discussed.

It was mentioned that the American Society for Testing Materials favoured changing the name of turpentine substitute to petroleum spirits and giving it a colour standard not darker than 21 Saybolt.

It was said that the wording describing the Water White and Prime White grades of kerosene had led to some discrimination against the latter grade, which was not intended by the Committee. A more definite cloud test temperature was advocated for Longtime Burning Oil. A general revision of the Lighthouse Oil specifications was proposed, and it was suggested that the burning test for signal oil be cut from 24 to 16 hours.

In view of the fact that the specification for fuel oil for Diesel engines, which had been intended to cover a very high grade of oil for submarines, has been criticised as being too stringent, a revision of the fuel oil specifications was proposed to show how several of the present grades can be used for Diesel and other oil engines. The raising of the permissible water and sediment from 1 to 2 per cent. was advocated with the penalty attached for all water and sediment above 1 per cent. It was shown that testing the viscosity of fuel oils at 77 instead of 70°F. would be in harmony with the work of the American Society of Testing Materials.

It was pointed out that further definiteness would be desirable in the test for emulsifying properties of lubricants. Most of the discussion on lubricants centred around Classes A, B and C. It was shown that the words "light," "medium," &c., as applied to these oils have different meanings when the oils are used for different purposes, and a system of numbering was advocated to replace the present names for the grades. A slight broadening of the viscosity limits was suggested in order to allow several commercial grades of oil to qualify under the specifications, and a relaxing of the colour and pour test standards was advocated for the same reason.

The Committee plans to study the specifications for aviation gasolines for all grades of greases during the coming year, and therefore did not take up these subjects.

At the close of the meeting the Chairman announced that he would tabulate the various suggestions made and would, within a short time, call a meeting of the Technical Committee to vote on the final form of the revisions, which would then be submitted to the Interdepartmental Committee for approval and publication.

The Committee on Standardisation of Petroleum Specifications, frequently known as the Presidential Committee, was a war-time committee originally under the direction of the Fuel Administrator but later transferred to the Bureau of Mines. Bulletin 5 was its last official publication, and contained all of the Committee's testing methods and specifications in their latest revised form. This war-time committee went out of existence on January 18 of this year, when the President authorised the Secretary of the Interior to form a new Interdepartmental Committee on Standardization of Petroleum Specifications.

The new committee met and organised on February 19 and adopted Bulletin 5 pending its revision. Each member of the committee appointed a technical representative, and these representatives were directed to form a Technical Committee to consider the revision of Bulletin 5 and to make recommendations in the matter to the Interdepartmental Committee. This plan was used successfully by the previous committee. The Technical Committee has met twice and has compiled a list of suggested changes and additions to Bulletin 5. Neither committee has yet voted on these proposals, but it is now planned to compile them in final shape and the Technical Committee will then decide what recommendations it will make to the Interdepartmental Committee.

The original committee tried to maintain as close contact as possible with the various industries involved in the manufacture and use of petroleum products. To make this contact even more effective the Interdepartmental Committee authorised the formation of an Adivsory Board composed of representatives of the several engineering societies interested. This Board met with the Technical Committee on May 4 and appointed Dr. T. G. Delbridge, representing the American Society for Testing Materials, as Chairman. It is hoped that the Advisory Board will serve to bring to the attention of the Committee such changes in the specifications as may become necessary from time to time, and that it will also be able to aid the Committee by making available the technical knowledge of the refiners and of the consumers of petroleum products.

British Dyestuffs Corporation

Appointment of New Chairman

AT a meeting of the directors of the British Dyestuffs Corporation, Ltd., held on August 8, Sir Henry Birchenough, having completed the special task which he undertook on behalf of the board, tendered his resignation as chairman, and Sir William Alexander was appointed chairman of the board. Sir Henry Birchenough remains on the board as a Government director of the Corporation.

Sir William Alexander, who is managing director of Charles Tennant & Co., Ltd., of Glasgow, entered the chemical works of this firm in 1899. He was Director of Administration, National Explosives Factories, Ministry of Munitions, in 1916-17; Controller of Aircraft Supply and Production from 1917 to 1919; and Director-General of Purchases in 1919-20.

Chemistry Students in Industrial Laboratories

By a Works Chemist

PREVIOUS to the Great War, the works chemist was comparatively unknown to the ordinary citizen, except in large industrial centres, chiefly where iron and steel are manufactured. Even then people outside the works did not know the nature of their work. During the war the chemist came more into the public eye owing to the fact that the works chemists were insufficient in numbers to cope with the needs of the moment, and assistance was required. Youths and girls flocked into the works to assist in routine work, which did not require an elementary knowledge of chemistry. No one doubts that they served a useful purpose at a time of great need, and, incidentally, received wages which the chemist who was there before, could never hope to attain.

When the armistice came, these extra employees were not required, and hundreds were paid off. The works chemists received wages in the form of bonuses which were granted through the organisations of other trades, but not for chemists as a class of professional men. The chemist in proportion to his work was, and is, the worst paid man on the works. The bonuses and higher wages granted during the war, made it a profession apparently worth entering. It was with the object of maintaining, or improving that standard that the N.A.I.C. was formed. Since the miners' strike and general depression, numbers of chemists have been dismissed or suspended. Also the bonuses granted by employers to meet the cost of living are being rapidly withdrawn, quicker than the cost of living is falling. The chemist who proved his worth over and over again, is slipping back to oblivion as far as employers are concerned, to be the necessary evil he was always considered. During the last three or four years parents have been sending their sons and daughters to college to train as chemists, take their degrees, and come into the industries. Hundreds will be turned out shortly. They will come into the laboratories full of examination passes, degrees, etc. Employers as a class are not chemists, and are impressed by magic letters after a name. The students think that the degree will enable them to go into a laboratory and commence work at a fair salary. When they get there they find that they know nothing of works practice, and that they must begin afresh.

It is becoming quite a practice for students at colleges who have a long vacation, as at present from July to October, to write to firms for permission to work their vacation without remuneration, just to gain a little assistance in their studies. Employers are giving encouragement to students nowadays, and by allowing works visits are doing much good. They are granting their requests readily. The writer has experience, as a works chemist, of this sort of thing, and in some cases the students are granted a nominal wage for their three months' assistance in the work. As a matter of fact, they are of no assistance, but the reverse in a busy laboratory. The staff have to attend to their own duties, and instruct the students, who are supplied with note-book and pencils, gaining information and "wrinkles" in three months, which it has taken years of practice to perfect. They own that they have been taught no works' methods at college, but, at the same time, hope to commence work at a salary more than many works' chemists of years in the laboratory have yet reached.

In a large works laboratory the chemist is expected to be a veritable encyclopædia of information, and is called upon to do complicated analyses at a moment's notice. It is often outside his particular line, but he must find out, and, having done so, that form of analysis becomes a regular institution. He improves with practice, and develops a reliable method which gives a result in the shortest possible time. Must he give gratuitously all the experience of years to college students, when he gives them a job, as he is bound to do?

As a worker for the N.A.I.C. from its commencement, the writer, and his staff, are ready to help all youths who come into the laboratory with a knowledge of chemistry, and are going to serve an apprenticeship. Every encouragement is given to help them in their classes, and to go in for degrees if they wish. What is objected to is the students coming into the laboratory practically to serve an apprenticeship at the present journeyman's wage. It is only natural that students whose education has been costly, and who have attained sufficient book and practical knowledge to pass examinations, should look for recompense by at least a living wage when they are ready to commence work. For those who hope to go into the dyes and colour branch, for instance, and have specially studied for it, there is plenty of scope because it is a branch that is only developing in this country. Even there the man on the job knows most, but there is room for unlimited research.

In most laboratories the analysis must be accurate and at the same time rapid. There is no time to wait for the novice to practice a dozen or two estimations before a report is made. He may conscientiously perform a complete analysis of an everyday sample in the laboratory and think that it is correct; but it is only the trained man who can tell at a glance that it may be wrong, because the chemist knows what the analysis should be, whereas the inexperienced has no idea. There are many useful books on the analysis of works materials, and an intelligent youth trained in chemistry can apply his knowledge while following the instructions, but no book points out the pitfalls which arise, and why the analysis turns out wrong. The writer knows of an actual case where the chemistry master at a technical school told his pupils that works' chemists only looked at a book, and all that was required was to get the same result as someone else.

As stated previously, hundreds of students, trained, as they term it, will be turned out of colleges and seek employment in laboratories, and some will have the advantage of stating some works' experience, gained as stated, and by the aid of the degree perhaps get the best posts. There is one sect of opinion in the country who do not recognise a large number of the employees in laboratories as chemists. Perhaps thay are not in the true sense of the word, but they have been, and are, earning their living by the application of chemistry, and until a real definition of the word "chemist" is found, the writer is of opinion that they are entitled to the name while they are performing the duties of a chemist.

In conclusion, I would point out the necessity for all works chemists to support the N.A.I.C. and make it a strong organisation, and enable it to deal with the question raised, which is only one amongst many. The N.A.I.C. is the sole organisation which caters for the chemist of the present as well as of the future.

Potentialities of Pure Nickel

Results of Recent Investigations

IN the course of his speech at the seventh annual general meeting of the Mond Nickel Co., Ltd., held on August 5, at 39, Victoria Street, S.W., Mr. Robert Mond (chairman), referring to the year's trading, said the bulk of the stocks of nickel and the very large quantities of scrap containing nickel which had accumulated during the war in the various belligerent countries had been absorbed, and as soon as the balance was disposed of and home and foreign industries revived they expected a considerable increase in the demand for the metal. The sales of copper sulphate, which was their other principal product, had considerably exceeded their production for the year, so that the stock on hand at end of the year was less than at the commencement. Unfortunately, the price obtained for this product was unduly low, having regard to the cost. The adverse rate of exchange as against sterling in those Continental countries, such as France, Italy, Greece and Roumania, which were the principal consumers of copper sulphate, was undoubtedly the principal cause of the slump in the prices for this article during the last season. It was, he said, an encouraging fact that nickel was a metal which was daily becoming more popular. Its valuable properties were becoming better known as a result of scientific and practical investigation in many quarters, so that its utility for purposes where its use was hitherto thought to be impracticable would, no doubt, be widely extended. Members of their staff were fully alive to the immense potentialities of metallic nickel, and some of them were constantly engaged in exploring every avenue by which nickel could be put to a fresh use. The suitability of pure nickel for coinage had been recognised for a long time.

One great advantage with pure nickel coins was that they were practically impossible to counterfeit, as nickel had magnetic properties which were destroyed by small additions of other metals other than iron or cobalt.

Industry and Society

By Ernest J. P. Benn

To understand the differences between industrial problems as they present themselves in America and as they affect us here, it is necessary to go deep down into the foundations of the social structure in both countries. If industrial difficulties were concerned only with the manufacture and the marketing of goods; if in the discussions between the various parties it were possible to sweep aside all considerations other than those which have a direct bearing upon the business of production, if wages and hours and conditions were really the only things in our minds, then there would surely be very little trouble in the industrial field. Our difficulties in England are rendered greater from the fact that these things are to some extent merely reactions from greater forces working in a wider field. When the British trade unionist meets the British employer he starts with a prejudice arising from the fact that he belongs to a different social class, but when the American workman meets the American employer, it never occurs to him that there is any social difference, and indeed, he can never dismiss from his mind the fact that the employer was once a workman himself, and that the workman will, in the ordinary course of events, himself become an employer. It is undoubtedly ten times as easy to pass from one social class to another in America as it is here; the barriers between the classes either do not exist at all, or are so flimsy as to present few difficulties to those who would pass over them.

The Americans make great use of the word "citizen" and attach a very sacred importance to it. From the President downwards, everybody is a "citizen" and there is no attempt to classify them as we should do. There is, of course, an American aristocracy, but it does not depend upon a House of Lords, upon an elaborate system of precedence, upon titles and coats-of-arms, and, least of all, has it anything to do with heredity. One must understand these things if the point of view of the American labourer is to be appreciated. He will not join in a revolution to pull society down, for the very simple reason that to him society is a convenient and sensible arrangement to enable him, humble labourer that he is, to climb a little higher, or, in the minds of most of them, a great deal higher.

The European visitor to the United States is at first a little embarrassed by the absence of those social distinctions upon which he can always rely in Europe to ensure him a comfortable passage and to flatter his sense of importance. It is a little disconcerting to be addressed by a porter in a Customs shed as if one were a social equal, if not a social inferior. One can tolerate rudeness on the part of an English porter, because one feels, after all, that it is merely his way of balancing a social inferiority of which he is the victim. But to saunter out of the luxurious state rooms of the *Aquitania* and to hear a nigger truckman explain to a colleague "that this *man* wants his baggage checked," gives at first a sense of shock; the nigger might surely call one a gentleman, he will presently expect a tip, and a tip to an Englishman is the reward of servility. The American nigger, however, will offer no servility, and demand double the tip that any Englishman would regard as appropriate. When, as you become more accustomed to the ways of America, you discover the railway porter lunching by your side in one of the popular restaurants and distributing his tips with the same liberality that he has extracted from you, you acquire by degrees a sense of the fitness of things, which does not fit in at all with things as we know them in this country.

After a time, one's sense of manliness is enhanced by this definite degradation from the status of a gentleman to that of a man; the bell captain at the hotel tells the errand-boy to "take this man to room 2754," the porter at the door tells the taxi-driver that "this *man* wants to go to 139th Street West." My last experience of London was a haughty intimation from a waitress in a tea-shop, who declined to be moved by my appeals for help, that "the other *young lady* would be here presently." So one gets both ends of the story.

The perfect social equality which the Americans have achieved or rather, which they have never lost, is in no way better illustrated than by the rules at the White House itself. The visitor walks right into the President's residence without asking anybody. He wanders through the different apartments and inspects the pictures and the furniture, while the President himself does his daily work in an office in a little annexe erected near the street, for the convenience of callers. I, myself, stood with a little knot of a dozen people at the front door of the White House in order to raise our hats to Mrs. Harding as she came out for her morning drive. The White House, was, it is true, closed for one afternoon while I was in Washington, the occasion being a garden-party given by the President and his wife. As I was honoured by an invitation, I imagined that I might perhaps see a little more of the President's residence than I had already inspected as a mere member of the public, but I was disappointed. I had an interesting chat with a policeman on this occasion which throws a world of light on the subject of social equality. The policeman had served for 28 years in the White House, and his duty was to watch over the reception rooms. It appears that during the Wilson administration a suggestion was made that the drawing room should be railed off to prevent the boots of the public from doing damage to the parquet floor. The policeman put in his resignation as a protest because, as he said, he "could not stand there and tell American citizens that they could not walk on their own floor,"—the railing-off project was not carried through.

Little things, or rather big things like this, are the whole explanation of the absence of a Socialist Labour Party in America, and, while we in England are never going to part with those refinements of habits and customs which have come to us from history, we can learn something from the other extreme as exhibited in the United States. Indeed, I think we *are* learning something. Our economic difficulties will get less and less acute as we succeed in ridding ourselves of that which is stupid in our social arrangements. Without losing all those finishing touches which add so much to the joys of life, we can surely dispense with social distinctions which are merely used as barriers to emphasise class differences and inflame class antagonism. A great deal is already going on in this direction. The Duke of York's camp at Littlestone is merely an indication of a great movement which will, it is to be hoped, transform our way of looking at these things. The Duke has arranged a camp of 200 boys selected from industrial works in all parts of the country, who are to meet and live under canvas with 200 boys of similar ages from the leading public schools, including Eton and Harrow. Thus 400 members of the coming generation will carry with them for their lives a knowledge of the thoughts and aspirations of another class, which will make it difficult for any of them to entertain violent views with regard to one another. The Industrial League week-end movement is yet another example of the same sort of effort, and wherever one looks one sees a desire to break down social distinctions and substitute social equality.

The effect in the United States of a perfect social equality is to create a universal desire to build up. The lowest of the citizens has a vested interest in the social order. On the other hand, the effect of rigid social barriers and definite social classification in England is to make large masses of the people believe that they are the enemies of the social order and desire to break it up. Industry has to bear the brunt of this trouble, and the social order is attacked through wages and "ca-canny," and the interest of industrialists in the manners and customs of society thus becomes rather more apparent than is often recognised.

Drug and Fine Chemical Trade Wages

A DISPUTE having arisen regarding the wages paid in the drug and fine chemical trade between the Drug & Fine Chemical Manufacturers' Association and the various trade unions concerned, the matter was referred to the Industrial Court for settlement. The effect of the employers' proposals was that the wages of men and women should be reduced by 10s. a week, juveniles (males) by amounts ranging from 8s. to 2s. a week, and juveniles (females) by amounts varying from 7s. 6d. to 6s. a week in the case of those between 14 and 18 years of age. The award of the Industrial Court, issued on August 4, reduces the men's wages by 7s. per week, those of the women by 6s. per week, juvenile males by amounts varying from 1s. to 8s. 6d. per week, and juvenile females by 2s. to 5s. per week. The decision takes effect from the first pay day in August.

Improved Trade Returns for July

Slight Increase in Exports

TAKING into account the fact that work in the coal mines was only resumed on July 4, and that the renewed supplies of fuel could not be effective for some time after, the recovery of foreign trade as reflected in the Board of Trade returns for July may be regarded with a certain satisfaction, although the contrast to last year's total acts as a peremptory check on unbounded optimism. The imports for the month of July are £7,427,307 lower than in June, while exports, at £43,172,399, show an increase of £5,020,161 on the previous month. Re-exports, too, at £9,361,556, show an increase of £2,278,792.

The increase in exports during July, however, only barely serves to bring us back to the position we held in May, when exports were £43,088,418. Although the present increase is not sufficiently great as regards actual figures the mere fact that there are signs of recovery, however small, lends confirmation to the feeling that there is a tendency to a better state of affairs, though we are still a long way removed from the abnormal prosperity which followed on the close of the war.

A comparison with July, 1913, July, 1920, and July, 1921, is given below :—

	1913.	1920.	1921.
	£	£	£
Imports	61,783,683	163,126,786	80,737,174
Exports	47,164,702	137,451,904	43,172,399
Re-exports ...	8,310,849	17,848,479	9,361,556

As this comparison represents declared values only, it is necessary, in order to arrive at its meaning, to bear in mind the wide fluctuations in prices, and take the value figures in association with quantities and prices. Taking 1913 as the datum of 100, the percentages of values, quantities and prices for 1920 and 1921 (the 1921, figures are based upon the first six months of the year) work out thus :—

	1920			1921		
	Values.	Q'nties.	Prices.	Values.	Q'nties.	Prices.
Imports	251·9	88·3	285·1	157·0	73·3	205·8
Exports	254·2	70·91	358·5	143·5	45·9	312·7
Re-exports	202·9	90·2	224·8	84·1	59·1	142·5

From this table it will be seen that there has been, as compared with July, 1920, a decrease in the average price of imports of 79·3 points, of 45·8 points on the average price of exports, and of 82·3 points in that of re-exports, and to that extent the comparison of totals of declared values is discounted.

Dyes and Dyestuffs

Looking into the imports of dyes and dyestuffs we find that 10 cwt. of coal tar intermediates were imported during July, there having been no imports of these products since March, when 563 cwt. came into the country. Finished dyestuffs obtained from coal tar all show decreases on the previous month's figures, alizarine being 33 cwt. as against 2,612, synthetic indigo, 15 cwt. as against 21 ; and other sorts, 383 cwt. as compared with 526. Cutch imports have jumped from 200 cwt. to 1,975, and natural indigo, none of which was imported in June, come in to the extent of 8 cwt. Under painters' colours and materials, ground barytes has gone up from 12,187 to 20,490 cwt., white lead (basic carbonate) from 4,323 to 7,884 cwt., and white lead (other sorts) from 30,396 to 34,251 cwt. The value of the imports under the heading of dyestuffs and painters' colours imported during July was £175,426 as against £162,809 in June.

Turning to the exports of dyes and dyestuffs, of which no detailed figures are given, coal tar products are down to 2,511 cwt. as against 3,568 in June and 4,018 in May, and dyestuffs of other sorts stand at 4,058 cwt. as against 3,645 in June and 2,989 in May. The total quantity of all dyestuffs exported during May is, therefore, 644 cwt. less than the June figure, which latter showed an increase of 206 cwt. on the previous month. Of barytes, 804 cwt. was exported during July, as against 708 in June ; white lead 10,952 cwt. as against 7,200 ; and white lead, other sorts, 57,937 as against 51,983. The total quantity of exports under this heading amounted to 69,693 cwt. or 9,802 cwt. more than the previous month, and the value shows an increase of £29,999.

Chemicals and Drugs

Imports of chemicals and drugs showing an increase over last month's figures are given below, with the June figures in parentheses : Acetic acid (including acetic anhydride), 105 tons (89) ; tartaric acid (including tartrates not elsewhere specified), 2,912 cwt. (2,450) ; borax, 692 cwt. (400) ; calcium, 17,932 cwt. (16,443) ; crude glycerine, 1,662 cwt. (1,499) ; nickel oxide, 2,086 cwt. (85) ; potassium nitrate, 11,599 cwt. (10,429) ; sodium nitrate, 23,130 cwt. (19,800) ; and zinc oxide, 350 tons (340). The decreases, similarly compared, are : Bleaching materials, 972 cwt. (1,264) ; distilled glycerine, 129 cwt. (426) ; red lead, 405 cwt. (726) ; sodium compounds (other than nitrate), 9,667 cwt. (76,037) ; and cream of tartar, 4,095 cwt. (5,309).

Sodium Compounds Decline

Exports generally show slight signs of improvement and items showing this are sulphate of ammonia, bleaching powder and glycerine ; sodium compounds are down by nearly one half. The following figures give in detail the products which show increases over the June exports, the figures for the latter being given in parentheses : Sulphuric acid, 2,226 cwt. (1,042) ; sulphate of ammonia, 6,510 tons (4,984) ; bleaching powder, 4,660 cwt. (3,425) ; carbolic acid, 5,137 cwt. (3,921) ; naphtha, 3,543 galls. (1,475) ; tar oil, creosote, &c., 868,287 galls. (569,290) ; coal-tar products (other sorts), 25,809 cwt. (9,246) ; glycerine, 8,080 cwt. (6,985) ; potassium chromate and bichromate, 990 cwt. (267) ; sodium chromate and bichromate, 2,314 cwt. (1,197) ; sodium compounds (other than here mentioned), 28,243 cwt. (15,644) ; and zinc oxide, 50 tons (39). The following show decreases : Tartaric acid (including tartrates not elsewhere specified), 299 cwt. (308) ; ammonia chloride (muriate), 121 tons (214) ; benzol and toluol, nil (317 galls) ; naphthalene, 2,784 cwt. (3,091) ; sulphate of copper, 558 tons (1,221) ; potassium nitrate (British prepared), 489 cwt. (833) ; sodium carbonate (including soda crystals, soda ash and bicarbonate), 52,408 cwt. (172,428) ; caustic soda, 13,366 cwt. (22,069) ; and sodium sulphate (including salt cake), 26,779 cwt. (28,249).

During July 816,320 tons of coal, valued at £1,559,649, were exported ; the exports for the preceding months of this year were as follow : June, 7,502 tons ; May, 14,066 tons ; April, 606,548 tons ; March, 1,968,078 tons ; February, 1,729,148 tons ; and January, 1,700,106 tons.

Scientific, illuminating, optical, &c., glassware was imported to the extent of 32,767 cwt., valued at £130,591, as against 31,632 cwt., to the value of £142,736 imported in June. Exports under this heading amounted to 1,975 cwt., of the value of £35,197 ; the previous month's total was 1,785 cwt., valued at £31,504.

Public Examination of H. E. Mayer

HUGO EDOUARD MAYER, Chatsworth Road, Brondesbury, N.W., who had been interested in companies dealing in chemicals, attended at the London Bankruptcy Court, on August 9, for public examination on a statement of affairs showing gross liabilities £6,722, and a deficiency in assets of £6,496. In answer to the Official Receiver, the debtor said that in 1909 he carried on business as an outside stockbroker at 79, Coleman Street, E.C. In 1910 the business was converted into a limited company called L. Jacobson & Co., Ltd., of which he acted as managing director. On the outbreak of war the company's operations in stocks and shares came to an end and the company carried on an export business, chiefly in chemicals, until its liquidation in May, 1919. He then formed a new company called the Anglo-Continental Mercantile Corporation, Ltd., which also carried on an export business. He acted as managing director of this company until January, 1920, when he resigned. In May, 1918, he formed the Ink Manufacturing Supply Co., Ltd., the name of which was afterwards changed to the Blackamoor Chemicals & Colours, Ltd., and of which he became a director. This company was now in compulsory liquidation. The debtor attributed his failure to losses in connexion with L. Jacobson & Co., Ltd., and the Blackamoor Chemicals & Colours, Ltd., to interest on loans, and to bad trade. The Official Receiver suggested that the debtor had traded through the medium of companies so that he need not disclose his foreign name and enemy origin. The debtor agreed.

The examination was concluded.

New Continental Service

Harwich-Zeebrugge Route

THE new short sea route to the Continent via Harwich-Zeebrugge, recently inaugurated by the Great Eastern Railway Co., adds yet another to the well-known routes via Harwich. The service is thrice weekly in each direction—Mondays, Wednesdays, and Saturdays outwards, and Tuesdays, Thursdays and Sundays inwards.. Leaving London (Liverpool Street) at 8.40 p.m., Zeebrugge is reached in time to catch the 6.10 a.m. connecting train for Bruges, Brussels and beyond; and, in the reverse direction, leaving Zeebrugge at 11.30 p.m., London is reached at 8.0 a.m.

The Harwich-Zeebrugge route opens up a new gateway to the Continent—Belgium, Germany, Switzerland, Italy—and particularly to the attractive coast resorts of Belgium—Blankenberghe, Ostend, Heyst, Knocke, &c. The service, moreover, provides a convenient route to the Ypres salient and Belgian battlefields, to Brussels and the interesting old Flemish cities, to Spa and to the Belgian and Luxemburg Ardennes. The journey occupies none of the working hours of the day, a great advantage alike to the business man and the tourist. An additional advantage lies in the provision of a service from Belgium to England on Sunday night. The "week-ender" can leave on Saturday night, spend a full day at one or more of the coast resorts, or at Bruges, or in visiting the Ypres Salient, and be back in London in time for business on Monday morning. Spending Saturday and Sunday night on the boat, he is relieved of any luggage worries and pays no hotel bill. Cheap return tickets are issued for these special week-end excursions and for British subjects availing themselves of this facility a passport is not essential. Finally, the new route will be of great importance to the business man and in developing trade between Great Britain and Belgium, as it affords a direct and expeditious connexion between the manufacturing towns of the Midlands and the industrial centres of Belgium. The Flemish agricultural districts, too, become closely linked up with London, which will facilitate the conveyance of market produce to the metropolis. An illustrated booklet giving full particulars may be obtained on application to the Publicity Department, Great Eastern Railway, Liverpool Street Station, London, E.C. 2.

The Nitrate Market

IN the course of their monthly nitrate report Messrs. Henry Bath & Son write as follows: The widespread development of drought throughout July accentuated the idleness of spot markets, and although second-hand sellers in Belgium reduced their price to the parity of about £14 15s. the amount of nitrate sold there or elsewhere has been negligible. Some selling of spring 1922 delivery has been passing at the parity, based on current exchange, of about £13 5s. to £13 10s. Meantime a few desultory sales of secondhands were made f.a.s. Chile at 9s. 3d. to 9s. 9d. per quintal for ordinary prompt to October shipment, and a little August refined changed hands at 9s. 9d. Latest quotations for ordinary range from about 9s. 6d. to 10s. over the next few months.

Research Chemicals in U.S.A.

RESEARCH chemicals and others not commonly available are to be listed in a forthcoming publication of the U.S.A. National Research Council. Dr. C. J. West, secretary of the committee, is sending out requests to every manufacturer of chemicals, stains, drugs and similar commodities asking them to furnish him with the list of products actually manufactured or products for which American companies are agents. This work will not include a listing of heavy chemicals or the more common chemical reagents, but it is intended to assist those doing research or occasionally using rare chemicals as raw materials to get in touch with all manufacturers of these products. Special emphasis is being made by this committee on the importance of small orders. Where a company is willing to handle these, say, in quantities less than 1 lb., this distinction will be indicated in the printed list. Manufacturers who have not already been reached by the committee are invited to communicate with Dr. C. J. West, Committee on Research Chemicals, National Research Council, 1701, Massachusetts Ave., Washington, D. C.

Chemical and Metallurgical Corporation

Results of the Elmore Process

AT the first ordinary general meeting of the Chemical & Metallurgical Corporation, Ltd., held on Tuesday at River Plate House, E.C., Mr. Herbert Guedalla (the chairman) said it was due to Mr. Frank Elmore's unremitting attention that they found themselves in the position to work their process with the higher costs of materials and labour existing to-day at a figure materially less per ton of ore treated than was contemplated at the time they commenced work. Moreover, the process had been developed and perfected in rather a remarkable way, so that to-day they felt justified in believing that in regular commercial work on extremely complex ores, which up to the present time had proved commercially valueless, they could obtain recoveries of practically from 90 per cent. to 100 per cent. of the lead contents; that the silver recovery had been improved from about 30 per cent. to over 90 per cent.; and that the zinc recovery had been improved from about 85 per cent. to over 95 per cent., depending to some extent, of course, upon the grade and the nature of the ore to be handled. Other very important benefits had been secured. They had developed their methods so that the treatment of lead-copper ores and the separation of lead-copper matter was now well within the scope of their operations. From the advices they had received this appeared to form a valuable new field for their process.

Mr. Guedalla then referred to a report on the process made by Mr. A. T. Cocking, chemical engineer. In the course of this report Mr. Cocking stated that he had studied the principle upon which the Elmore process operated for the separation of the metallic contents of complex lead and zinc ores, and had witnessed its application to the separation of lead, zinc and silver from the middlings remaining after the recovery of concentrates in Burma ore, both by testing each stage in the process separately on a laboratory scale and by the continuous treatment of the ore in the plant at Harlesden. The heated sample before treatment contained: Lead, 20·33 per cent.; zinc, 36·80 per cent.; silver, 23½ oz. per ton. The average result after treatment by this process was an extraction of 99 per cent. of the lead, recovered as lead sulphate, and 87 per cent. of the silver, leaving a residue which contained 50·4 per cent. of zinc (free from lead), equal to 96 per cent. of the original zinc. As indicating the cyclic character of the process and consequent regeneration of the chemicals used in its operation, Mr. Cocking stated that sulphuric acid could be produced in greater quantity than was required for use in the process, and with regard to the other re-agent employed—namely, the salt—he said the salt would to a greater extent be regenerated and used again. With regard to working costs, Mr. Cocking stated that in England the working costs for recovering the lead in the form of sulphate precipitating the silver and separating the zinc residues, in a plant dealing with 500 tons of ore per day and provided with proper labour-saving appliances, should not with the present rate of wages and prices of stores substantially exceed 10s. per ton of ore, including provision for depreciation but without allowing for amortisation.

Mr. Cocking foresaw the abandonment of gravity methods of treating these complex ores and the replacement of such methods by some form of solvent extraction, and added that it was difficult to anticipate a more complete and less expensive method of applying this principle than that devised by Mr. Elmore.

After referring to trials upon ore from the Burma Corporation's mines, Mr. Guedalla said that this group had decided to complete an agreement with the Corporation, and had also announced their intention of erecting a plant in Australia.

The Corporation had also taken a substantial interest in a syndicate formed for investigating a metallurgical invention of great promise, and it appeared as if the Corporation had secured on very moderate terms an interest in an invention of real importance and capable of earning large profits from what, up to the present, had been practically a valueless raw material.

A new special formula for DENATURED ALCOHOL has been made official by the United States Internal Revenue Department and is to be known as Formula 23 D. The denaturants are 20 lb. tannic acid, U.S.P., and 25 lb. refined camphor to every 100 gallons of ethyl alcohol.

Conservation of Natural Gas

Legal Decision Affecting Gas Carbon Producers

THE Supreme Court of the United States has recently given a decision which will affect the producers of gas carbon. On the score of conservation of natural gas, and in the interests of the civil population, it has been decided that the wasteful and uneconomical production of carbon black from the incomplete combustion of natural gas shall not be carried on by the Midland Carbon Co. This company have been producing 13,000 lb. of gas carbon per day, sufficient for the manufacture of 117,000 lb. of printing ink. This, however, necessitated the consumption of 15,000,000 cubic ft. of natural gas per day, and affected the supplies of the gas to the Lovell Gas & Electricity Co., which supplies the town of Lovell, in the State of Wyoming. In fact, it is calculated that the wells would soon have been exhausted if the gas had continued to be used at the above-noted rate.

It was pointed out in defence that the value of the carbon black was greater than that of the gas from which it was manufactured, and that in addition 1,600 galls. of gasoline per day were obtained from the gas, subsequently partially burnt in the production of carbon black. Moreover, 375,000 dollars had been invested in the company, and stoppage of their works would still leave competitors, possessing works situated more than 10 miles from a township, in a position to continue their production. The application to restrain the Attorney-General of the State of Wyoming from enforcing the State Law was, however, refused on the grounds that possession of the land did not necessarily imply possession of the gas and oil derived therefrom, especially when the abnormal consumption deprived the domestic population of heat and light.

The decision will, no doubt, cause greater attention to be paid to the improvement of the process of making carbon black, which at present returns at best a 5 per cent. efficiency. A maximum 1·75 lb. of carbon are obtained from 1 000 cubic ft. of gas. The natural gas is incompletely burnt, the flame jets almost touching cast-iron plates, which move slowly backwards and forwards, whilst the carbon produced is continuously scraped off. It is true that many attempts have been made to increase the efficiency of the original process, but greater yields have usually resulted in the production of a lower quality of carbon, unsuitable for incorporation in a printing ink. Conservation legislation may, however, cause intensified efforts to be made in this direction.

Benn Publications

THESE well-known publications and scientific and technical books will be well before the trade and public during the autumn and winter months. Prominent positions have been secured at several of the more important Exhibitions, including: The Shipping, Engineering and Machinery Exhibition, Olympia, September 7 to 28, and the Ideal Homes Exhibition, Kelvin Hall, Glasgow, September 19 to October 8.

The scientific and technical books and publications will be on view at the annual conference of the Library Association at the College of Technology, Manchester, from September 13 to 17. A good exhibit will be made of suitable publications at the Dairy Show, Agricultural Hall, Islington, in October, to be followed by a similar stand at the Smithfield Show a month later. The Benn publications will also be strongly represented at the British Industries Fair, Birmingham, in 1922.

Further particulars of the exhibits and positions of the stands will be announced as the times for the Exhibitions approach, so that all interested may have an opportunity of inspecting the many valuable publications issued by this house.

Synthetic Carbamide: A New Fertiliser

IT is reported from Berlin that Professor Bosch has invented a new nitrogen fertiliser, known as synthetic carbamide, and that this product is produced by the Badische Anilin und Soda-fabrik. This product is claimed to have a nitrogen content three times that of Chile saltpetre, and is said to be weather proof to a high degree and innocuous even when used in excess. It is thought that limited quantities of synthetic carbamide will be available by the end of this year.

Chemical Trade Wages

Mr. Roscoe Brunner on the Present Position

MR. ROSCOE BRUNNER, chairman of Brunner, Mond & Co., Ltd., and of the Chemical Joint Industrial Council, delivered an address to the Workers' Representative Council at Lostock, Northwich, on August 4, on the wage negotiations and the present position of industry. Notices have been posted of an immediate reduction of 2d. per hour in chemical wages, with a review of conditions in October.

Mr. Brunner declared that the world's conditions of trade were very bad. Staple trades showed small signs of improvement. The chemical trade here, in America, and in France was depressed. Germany was somewhat better, owing to the exchange. Brunner, Mond were now meeting with competition from Germany in several products. The destruction of wealth was the cause of bad trade, and prosperity could only come by hard work and savings. Only by producing more at a cheaper cost could trade recover. The chief way in which the cost of production could fall was by a reduction in labour costs.

The reduction had not been enough. It was vital that coal should be below £1 a ton, and wage-earners in industries using coal would suffer till the price fell. Chemical profits and dividends disappeared if the output was reduced to a low figure, and during the coal dispute no profit was made.

What the future had in store he did not know. Reductions, or the passing of dividends generally, would be accentuated. Until trade improved all classes must accustom themselves to the fact that an increased standard of comfort was not necessarily permanent. He did not say wages had to fall below pre-war level, but the standard of comfort might have to go.

Allowing for wage reduction from August 1st, chemical day labourers would get 58s. 9d. per week, and shiftmen 90s. 8d., based on the cost of living. Chemical labourers were 8s. 2d. and shiftmen 24s. 8d. better off than in pre-war days.

Affairs of F. T. Jowett

THE receiving order in the case of Frank Thornton Jowett, 14, Cannon Place, Brighton, Sussex, formerly trading as the City & Midland Manufacturing Co., and lately carrying on business at 31A and 33, Broad Street House, London, manufacturing chemist's salesman, was made on June 28 on a creditor's petition. The liabilities are returned at £1,215, of which £935 is due to unsecured creditors, while there is a partly secured creditor for £480, holding security valued at £200, leaving £280 to rank as unsecured. There are no assets. Debtor attributes his position to breach of contract by a customer, and being found responsible for debts of City & Midland Manufacturing Co. He was formerly employed by a chemical manufacturing firm in Yorkshire. In May, 1920, a business was started by a friend of his under the name of the City & Midland Manufacturing Co. He provided about £100, which was the only capital of the firm. In consequence of proceedings having been taken against this concern for breach of contract, judgment was given against the debtor personally for £824 1s. 9d. and costs, and upon this judgment the present proceedings were founded. The business of the firm ceased, and debtor went to Brighton, where with his assistance a friend of his commenced a chemical manufacturing business, and employed him as salesman and manager. He became aware of his position in or about April last.

Saskatchewan Salt Deposits

A PLANT is being completed at Senlac, Saskatchewan, to produce dairy salt from the salt deposits, and it is expected that almost 850 tons will be produced this season. The dairy salt will be taken by the Saskatchewan Co-operative Creameries at Regina, and the balance of the rough salt, when cleaned, will go to laundries at Edmonton, Saskatoon, Regina and Moose Jaw. A plant is stated to be in course of erection at Fusilier for the manufacture of sodium sulphates from the deposit there. This will have a capacity of 20 tons, and shipments will begin this summer.

Dr. Carl Duisberg, of Leverkusen, Germany, has issued a statement to the effect that the total production of GERMAN DYESTUFFS this year will not exceed 60,000 tons, which will make it impossible to flood the markets of England or America or even to compete successfully against them.

Chemical Matters in Parliament

Safeguarding of Industries Bill

MR. KILEY (House of Commons, August 8) asked the Under-Secretary of State for Foreign Affairs whether he had received representations from the French Government concerning the position of France under the provisions of the Safeguarding of Industries Bill; and whether he was prepared to make any statement appertaining to the same.

Mr. Harmsworth said the answer to the first part of the question was in the affirmative, but it was clearly not possible to state in advance what action under the Bill, when passed, it might be found necessary to take in regard to France or any other country.

Sir A. Warren (House of Commons, August 10) asked the President of the Board of Trade, having regard to provisions in the proposed Safeguarding of Industries Bill to impose a duty equal to one-third of the value of the goods, what system of calculation he proposed to adopt to meet the variations of exchanges of the different countries concerned?

Sir W. Mitchell-Thomson said the same system would be adopted in regard to the duties provided for in the Safeguarding of Industries Bill as obtained in regard to the *ad valorem* duties imposed by the Finance (No. 2) Act, 1915—*i.e.*, invoices in foreign currency would be converted into sterling at the rate of exchange current on the date of the importing ship's report.

Captain W. Benn (House of Commons, August 10), in the debate on the Safeguarding of Industries Bill, moved a new clause for the exemption from duty of goods used for educational or scientific purposes. Unless some amendment of this kind was made, he said, the Bill would hamper research in every way.

Sir P. Magnus said it was of importance to have chemists with a great knowledge of research in connexion with any particular industry, but that was not much use unless there was some opportunity of their being employed. The object of the Bill was to render this country independent for the first time of any foreign country in the production of instruments absolutely essential in war time and most useful in times of peace.

Captain Coote maintained that the acceptance of the clause would be a direct benefit to British scientific research and education.

Sir P. Lloyd-Greame said the point was, either they were going to protect the implements with which research was carried on or not protect them at all. These duties were only to last for five years, and it took Germany a good deal longer than that to build up her industry. He suggested that as soon as there was no competition fostered by British protection the prices of the German articles would soon be raised against British purchasers. The issue raised by the proposed clause was whether we were to have the inter-relation of scientific research and commercial endeavour going forward together, and that was the surest way of promoting the interests of industry as well as the interests of scientific institutions.

The guillotine closure resolution in its relation to Clause I. came into operation at seven o'clock, and the House divided. For the clause, 80. Against, 231. Government majority, 151.

The Government's amendments to Clause I. were then agreed to.

Mr. Lyle-Samuel then moved to leave out Clause II., which deals with the power of the Board of Trade to apply Part II. (prevention of dumping) to certain goods.

On a division, there voted for the amendment, 165, and 63 against.

The Bill as amended was further considered on Thursday.

Naval Cordite Factory

Sir W. Barton (House of Commons, August 3) asked the Parliamentary Secretary to the Admiralty whether he would give the amounts proposed to be expended on land, water rights, buildings and plant at the proposed cordite manufacturing factory in Dorsetshire; the quantity of water available and whether it had been analysed, and if so, the percentage of hardness and also the average weight of cotton per day proposed to be treated; and was he aware that with existing plants an absolute guarantee could be given to extract every particle of foreign matter from the cotton.

In his reply Commander Eyres-Monsell said no expenditure on land or water rights was involved. The estimated expenditure on buildings was £46,000 and on plant £48,000. Two million gallons of water a day were available; this could be increased to 3,000,000 galls. if necessary, and was ample for all purposes. It had frequently been analysed, the degree of hardness being 26 parts per 100,000. The amount of cotton to be treated per day would vary according to the requirements of the factory, the output being regulated, together with that of other raw materials, to produce the amount of cordite that might be required. Although the cotton might leave the mill clean, it was impossible, without considerable further expenditure, to ensure that it reached the factory at Holton Heath in precisely the same condition; and the essential advantage which would be gained from the plant at Holton Heath was that final purification would take place immediately before nitration, so that the cotton would not be handled in transit subsequent to the cleansing process.

British Perfumes

Major Kelley (House of Commons, August 10) asked the President of the Board of Trade if he was aware that the Australian Commonwealth Customs authorities had issued an order, dated December 31, 1920, stating that, whereas certain manufacturing perfumers in Great Britain manufactured for exportation in bond, their manufactures only would be subject to duty in Australia based on their export catalogue prices, whereas, in the case of their contemporary or any manufacturers in this country whose goods were prepared in free factories from spirit upon which the Excise duty had been paid and subsequently drawback obtained, their goods were subjected by the Australian Government to duty based on the full home consumption values, no deduction for duty on drawback being allowed; and would he be prepared to approach the Australian Customs authorities to revert to the conditions prior to December 31, 1920, in the interests of this trade in Great Britain?

Sir W. Mitchell-Thomson said his attention had been called to the matter and the Federal Customs authorities had been approached. He understood that the question of amending the Regulation was under consideration and that a decision might be expected shortly.

Slag Phosphate

Lieut.-Commander Kenworthy (House of Commons, August 8) asked the Minister of Agriculture whether his attention had been drawn to the statements appearing in the advertisements of W. Sinclair & Son, Ltd., in connexion with their agricultural fertiliser, a product obtained from the phosphatic deposits to be found on Nauru Island; whether the claim of this company, that the fertiliser obtained by them from this source was of guano origin, received his sanction in view of the fact that the Ministry's acquiescence in these claims was indicated in the circulars issued by the company.

Sir A. Boscawen said his attention had been drawn to the advertisements and circulars issued by Sinclair & Son, Ltd., in connexion with the fertiliser known as "Slag Phosphate." The technical advisers of the Ministry were satisfied that while the Nauru phosphate, which formed part of this fertiliser, could not properly be described as guano, it had originated from guano and might accurately be described as a "phosphate of guano origin." The description applied to slag phosphate by Messrs. Sinclair, namely, that it was made from basic slag enriched by phosphate, of guano origin from Ocean and Nauru Island, was therefore one to which no reasonable exception could be taken.

Application for Naturalisation

In reply to Sir A. Holbrook (House of Commons, August 8), who asked the Home Secretary whether there was any ground for withholding a certificate of naturalisation from Mr. Julius Jung, research chemist, of 14, Bancroft Road, Stepney, Mr. Shortt said there were large numbers of applications submitted before this one still awaiting consideration, and it had not yet been reached.

Agricultural Research

Replying to Captain Elliott (House of Commons, August 8), Sir A. Boscawen said that in view of the special grant of £850,000 proposed under the Corn Production Acts (Repeal) Bill, it was not necessary to consider the question of reducing expenditure on agricultural education and research.

From Week to Week

Mr. D. C. HENRY has been appointed lecturer in chemistry in the University of Manchester.

Mr. F. ASHWORTH, analyst and consulting chemist, lately with Sir H. Trickett, Ltd., has joined the staff of Messrs. T. Webster & Co., ink manufacturers, of Liverpool and London.

MR. J. M. NUTTALL, senior lecturer in physics, has been appointed assistant director of the physical laboratory in the University of Manchester.

According to an Exchange message from Washington, dated Tuesday, the UNITED STATES EMBARGO on the importations of dyes has been extended to November 27.

At a meeting of the French Association for the Advancement of Science held in Rouen last week under the presidency of M. Rateau, M. G. CLAUDE delivered a lecture on the synthesis of ammonia.

A short-time system of one week off in six, and discharges at the rate of 300 a week, have not proved sufficient to do away with the slackness at WOOLWICH ARSENAL, and it is understood that further measures are under consideration.

In the monthly report on NITRATE OF SODA Messrs. Henry Bath & Son state that the visible supply for Europe on August 1 was 822,500 tons, as compared with 324,000 tons on August 1, 1920, and 150,000 tons on August 1, 1919.

It is reported from Amsterdam that a majority of the Dutch members of the International Association of Rubber Growers, including the largest producers, have REJECTED PROPOSALS for a further restriction of output.

The death occurred on August 1, in Newtonloan Hospital, Pathhead, Kirkaldy, of Mr. CHARLES S. AITKEN, who was employed in the laboratories of the cement works at Cousland. Mr. Aitken, who had only been ill for a fortnight, leaves a widow and one daughter.

Last week the remaining staff of engineers and others working in the GOVERNMENT MUNITION FACTORY at Gretna and Eastriggs received notice that their services are to end on August 31. The factory is then to be handed over to the Government Disposal Board.

It is reported that Mr. K. Krause, a DANISH CHEMIST, after experiments extending over several years, has invented a preparation which not only destroys stone in boilers, but also abolishes the pernicious effects of substances which, mixing with water, are found in them.

Mr. HENRY JOHN DAVIES, a chemist in the employ of Burroughs, Wellcome & Co., died suddenly at Colchester on August 1. Mr. Davies, who was 48 years of age, collapsed while playing a game of baseball, death taking place before the arrival of a doctor. At an inquest held on August 2 the Coroner returned a verdict of death from natural causes.

An indication of the possible development of Swansea as the oil-bunkering port for the British Navy is afforded by the announcement of the departure a few days ago of the tank steamer "British Duke" for the Firth of Forth with a cargo of 5,000 tons of the TREATED PERSIAN OIL for the bunkering of warships. This is the largest cargo of oil yet shipped from Swansea.

The proprietors of THE CHEMICAL AGE have secured a prominent position in the Gallery at Olympia, Stand 316, at the forthcoming Shipping, Engineering and Machinery Exhibition which opens on September 7 and closes on September 28. Copies of THE CHEMICAL AGE and other publications issued by Benn Brothers, Ltd., will be shown, and many scientific and technical books will be on sale.

As an instance of the harm done to trade between Great Britain and Spain by the existing freight rates, the Monthly Journal of the British Chamber of Commerce for Spain states that one of the largest British firms exporting SULPHATE OF COPPER to Spain has found it impossible to compete with the product of chemical manufacturers in Cataluña entirely owing to these high rates.

The ENGINEERS' CLUB, the membership of which already exceeds 2,200, has acquired the premises in Coventry Street and Whitcomb Street, formerly occupied by the Road Club. The Club is intended to be the London home of the British engineering profession, architects, chemical engineers and metallurgists being also eligible for membership. Mr. E. Manville, M.P., is the president, and Mr. E. L. Hill the honorary secretary. The club will be opened on Thursday, September 1.

Mr. SYDNEY MAURICE HAWORTH, whose death took place at "The Farm," Harrock Hill, Mawdesley, on August 1, at the age of 37, was associated with the Grove Chemical Works, Appley Bridge, of which his father was managing director. Mr. Haworth had for some years prior to the recent amalgamation with British Glues & Chemicals, Ltd., occupied the position of secretary. He was an enthusiastic golfer, and was well known in the Wigan district. The interment took place on August 4.

We understand that at the meeting of English NITRATE PRODUCING COMPANIES, held in London on Tuesday, the proposals made for removing the present deadlock in the industry were favourably received, and a cable was sent to the producers' association in Chile recommending action on the lines elaborated in the scheme. The chances of a workable plan being arranged for meeting the present glut of nitrate stocks have been increased by the agreement already reached with the German interests.

In their annual report the directors of the Welsbach Light Co., Ltd., state that the prolongation of the failure to fulfil pledges for the safeguarding of key industries and PREVENTION OF DUMPING has led to the ill effects foreshadowed in their last report. As the result of unrestricted imports of foreign goods produced and sent to this country under conditions of labour and exchange extremely adverse to British industry, sales have diminished, stocks have inevitably accumulated, and values have fallen. As a necessary consequence, they state, large numbers of trained hands have had to be discharged from employment.

The cause of the EXPLOSION IN A LABORATORY at Priddy's Hard, the naval shell-filling establishment, Gosport, on July 26, which resulted in the death of four men, still remains a mystery. At the adjourned inquiry held by the County Coroner at Gosport on August 4, Captain Colver discredited the theory that the explosion was caused by the abnormal heat, since although the dump was in the open it was covered with tarpaulin and was sprayed every day with water during the hot weather. No outside agency was responsible, and he could only attribute it to something none of them knew anything about. The coroner discredited any suggestion of negligence, and the jury returned a verdict of accidental death. An official inquiry is being held.

A telegram has been received in the Department of Overseas Trade from the Commercial Secretary to H.M. Legation at Buenos Aires to the effect that the local authorities are ADVERTISING FOR TENDERS, to be presented by September 2, for 5 160 tons of sulphuric acid and 12,000 tons of aluminium sulphate. Local representation by a resident agent is essential, but where intending tenderers are not already represented in the market the Department will furnish the names of likely firms through whom tenders might be lodged. A copy of the specification is being forwarded by mail and will be available for inspection by United Kingdom manufacturers and exporters on its receipt here. In the meantime, however, a copy of the specification and conditions of tender issued in connexion with a similar call for tenders last year may be consulted on application at the Enquiry Room of the Department of Overseas Trade, 35, Old Queen Street, Westminster, S.W. 1.

A meeting of business men of Glasgow and the West of Scotland was held in the Merchants' Hall, Glasgow, on Tuesday, to protest against the provisions of the SAFEGUARDING OF INDUSTRIES BILL as being injurious to the welfare of British industries. The promoters of the meeting specially emphasised their opposition to the proposal to hand over the control of the fiscal policy of the country to a committee nominated by the President of the Board of Trade. In a letter apologising for absence, Lord Inchcape declared that a more fantastic and unworkable measure had never been presented to the House of Commons. He did not think it mattered very much whether the bill passed or not. It would not materialise. If it did this country was done so far as the workers on the Clyde were concerned, and also all other industries on which we lived. From a population of 45,000,000 we would sink to a population of 10,000,000, which was all we could sustain by our own agriculture.

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Abstracts of Complete Specifications

165,801. BENZOL, TOLUOL AND LIGHT OILS FROM COAL GAS, PROCESS AND MEANS FOR THE RECOVERY OF. W. Hill, The Gas Works, Stalybridge, and T. Cook, Empire Works, Stalybridge, Cheshire. Application date, August 9, 1917.

The coal gas is passed through a washing apparatus which is supplied with oil by gravity from a drum which is slightly inclined to the horizontal. The oil is saturated with benzol, then flows by gravity to a storage tank. The saturated oil is then forced by a pump to a receiver at a higher level, which is provided with an overflow pipe leading back to the storage tank, so that the oil is maintained at a constant level irrespective of the speed of the pump. The oil then flows by gravity to an apparatus in which the benzol is distilled off, and the oil remaining then flows by gravity back to the drum which supplies the gas washer. In this apparatus only one pump is used, instead of the three usually employed, so that the risk of failure of the plant is decreased.

165,802. CENTRIFUGAL MACHINES FOR PURIFYING, COOLING AND MIXING GASES. H. E. Theisen, 25, Herschelstrasse, Munich, Germany. Application date, August 16, 1917.

In a centrifugal machine with revolving beaters for separating solid or liquid constituents from gases, and in similar gas-washing machines, means are provided to prevent the separated substances from passing back from the settling chamber into the current of gas. The fixed atomiser blades and the alternate revolving blades are curved like turbine vanes or buckets, and the separated liquid particles which pass radially outwards are diverted by outer curved surfaces to a passage at one side of the casing. The diverting surfaces and the stationary atomiser surfaces are made with a spiral curvature to divert the liquid to one side of the casing. The purified gas, which is almost anhydrous, is drawn off by a fan at the opposite side of the casing. At the uppermost part of the atomiser the diverting surface is constructed of two vanes, which are symmetrically arranged, and meet at a point close to the outer atomiser surfaces, where they form a ridge which prevents the formation of a dead point where the separated liquid would not pass to the right or left, but would fall vertically back into the revolving blades.

165,825. DISTILLATION OF COAL, SHALE, PEAT, WOOD AND OTHER BITUMINOUS OR ORGANIC MATERIALS AND APPARATUS THEREFOR. W. E. Davies, Highland View, Smithwood, Cranleigh, Surrey. Application date, May 13, 1919.

Carbonaceous materials are distilled in vertical, horizontal or inclined retorts by a combined external and internal heating. Gas is burned in heating flues along the side wall of the retort, and part of the waste gas is passed through adjacent alternate flues, where it is mixed with extraneous gas, such as blast furnace, blue water, coal, aliphatic and aromatic hydrocarbons, such as acetylene, olefines, hydrobenzenes, naphthenes, air, steam, hydrogen, tar or oil vapours, &c. The latter flues are provided with perforations along their length, through which the mixed gases are distributed over the carbonaceous material in the retort. By controlling the temperature of distillation, and by varying the extraneous gas added, the yield and nature of the by-products obtained may be varied. A large proportion of hydrogen in the gas with a temperature of 1,000°C. and a high pressure facilitates the production of ammonia, benzene and toluene; the use of steam introduced at a high pressure and at a temperature of 850°C.–1,000°C. facilitates the production of ammonia and hydrocarbons; the use of methane at 850°C.–1,000°C. facilitates the production of benzene and higher hydrocarbons; carbon monoxide facilitates the production of benzene and toluene at 650°C.–900°C.; and a high content of hydrogen, carbon oxides, methane and hydrocarbons with high suction at 750°C.–900°C. facilitates the production of uel oil.

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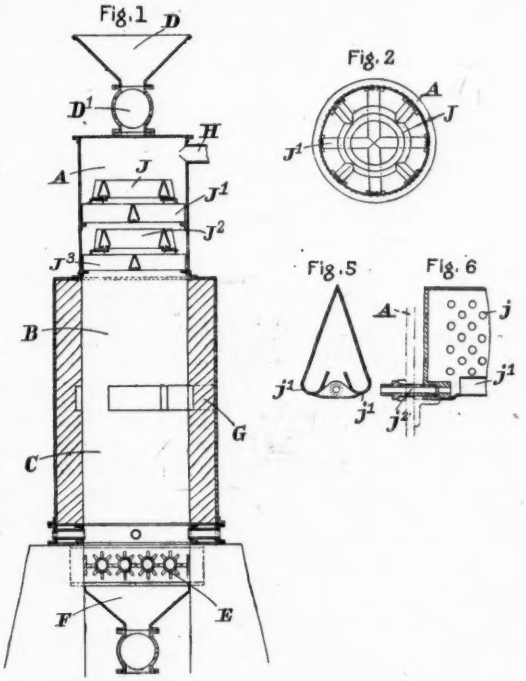
165,815. TREATMENT OF CARBONACEOUS MATERIALS FOR THE MANUFACTURE OF POWER GAS WITH RECOVERY OF THE HYDROCARBON OILS. S. Everett, 35, New Broad Street, London, E.C.2, and Carboil Syndicate, Ltd., Norwich House, Southampton Street, Holborn, London, W.C. Application date, February 5, 1919.

The material is distilled in a retort, *A*, which is superposed on a gas producer, *B*, *C*. The material is supplied through a hopper, *D*, and valve D^1 and the spent material is finally discharged through a grate, *E*, with reciprocating bars, to a hopper, *F*. Air and steam are supplied through the grate, and an outlet, *G*, is provided for power gas, and another outlet, *H*, at the top of the distillation chamber for the uncon-



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densable gases. The retort *A* contains a number of sets of condensation conduits, *J*, J^1, J^2, J^3, which are arranged diametrically or in concentric circles one above the other. Each conduit is of inverted V shape so as to break up the descending material, and the conduits in the different layers are placed out of line. The sides of each conduit are perforated as at *j*, for the passage of the condensible products of distillation. The condensed products are collected in channels j^1 and withdrawn through outlet passages j^2. The apparatus is applicable for the extraction of the hydrocarbon oils from low-grade carbonaceous material.

165,833. AMMONIACAL LIQUOR, TREATMENT OF. J. H. Fairweather, 14, Somerset Road, Brentford, Middlesex. Application date, July 9, 1919.

The ammoniacal liquor is run from the strong liquor well of the gas works to a Kestner evaporator, and is concentrated to 20 per cent., the free ammonia being passed directly to a sulphuric acid saturator, where it is converted into sulphate; or, alternatively, the vapour may be condensed to a concentrated solution. The gas is treated in a Claus kiln or passed into the gasworks foul main and the sulphur recovered. The residual liquor is passed through a heat exchanger to cool it, and to pre-heat the incoming cold liquor entering the evaporator. The cool liquor is again used for the absorption of the liquor, and again evaporated until a high concentration of fixed ammonia in the liquor is reached. The fixed ammonia may be recovered by heating with lime, or may be recovered

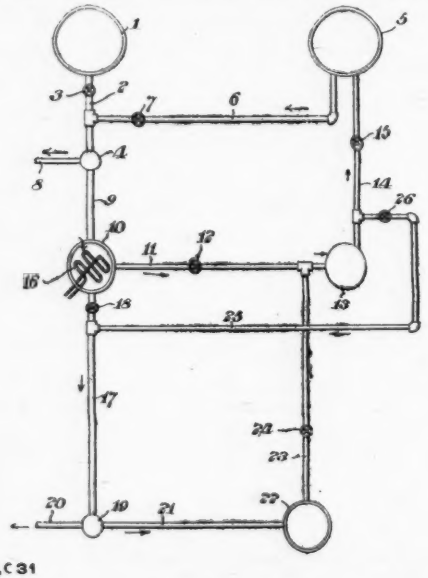
as ammonia salts. The weak liquor may be treated with steam above 90°C. before entering the evaporator to liberate most of the carbon dioxide and sulphuretted hydrogen. When the whole of the ammonia is converted into sulphate, a consumption of about 7 cwt. of fuel per ton of sulphate is obtained.

165,863. Distillation and Cracking of Mineral Oils and Other Hydrocarbon Containing Material. N. V. S. Knibbs, 810 and 811, Salisbury House, London, E.C.4. Application date, September 24, 1919.

Material such as petroleum is sprayed into the upper end of a vertical chamber which contains no packing material to impede its progress. A layer of refractory material is provided at the bottom of the chamber, and air and steam are passed upwards through it. The refractory material is initially heated, and air is introduced in sufficient quantity to effect complete combustion of the oil on the refractory material. The ratio of air to oil is then increased, so that ultimately the oil in its downward passage through the chamber is subjected to the action of hot combustion gases in counter current, and thus becomes progressively poorer in volatile constituents. The residue reaching the refractory material consists of pitch and oil, which is burnt by the admission of air to provide the hot combustion gases. The apparatus may be employed for distillation at atmospheric pressure, or for cracking at pressures of 500 lb. The temperature is regulated by controlling the combustion of the residual material. The gas and vapour are withdrawn and separated.

166,031. Separating Substances from Solutions, Particularly Paraffin Wax from Petroleum, Process for. P. T. Sharples, St. Davids, Pa., U.S.A. Application date, June 9, 1920.

The residue from the distillation of crude petroleum is mixed with about 60 per cent. of naphtha and heated to about 120°F. in a tank 1. The mixture is then cooled gradually during 48 hours to 10°F. and fed by gravity through a valve 3 to a centrifuge 4, which is also supplied with calcium chloride brine at 10°F. from a tank 5 through a pipe 6. The amorphous wax and calcium chloride brine are separated in the centrifuge 4 and pass to the tank 10, where they are allowed



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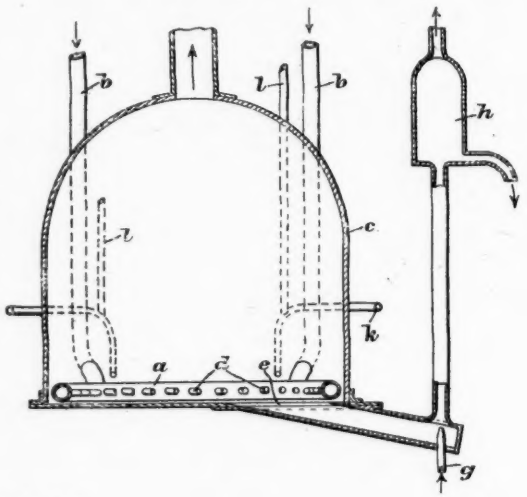
to separate by gravity. The lower layer of brine is drawn off by the pipe 11 to the pump 13, which delivers it through the pipe 14 to the tank 5 for use again in the system. The upper layer of wax in the tank 10 is liquefied by steam in the coil 16 and then drawn off through a pipe 17 to a centrifuge 19, where the wax is separated from any emulsified brine and is discharged through the pipe 20. The brine passes through a pipe 21 to a tank 22 and thence by a pipe 23 to the pump 13, which forces it back through the pipe 14 to the tank 5 for use again. This process of separating the wax from the petroleum is much more rapid than the usual gravity settling method.

166,036. Ammonium Sulphate Saturators. G. P. Heisch, of the Brentford Gas Co., Southall, Middlesex. Application date, June 18, 1920.

In the ammonium sulphate saturator as usually employed, the crystallised ammonium sulphate is collected from the bottom of the saturator which is made conical or inclined, or provided with a well. The pipes for introducing liquid in gas and also the injector pipe for the crystals are placed within the saturator and usually receive a deposit of solid matter from the gases, so that frequent cleaning is required. In the present invention the saturator is made with a flat bottom, which construction is cheaper, and no apparatus is placed



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within it except the jets for delivering the gases. The gases from the ammonia still are led to the annular pipe *a* by four pipes *b* which are outside the saturator, and the gas is delivered tangentially into the saturator through a large number of jets *d*. The acid is delivered from the tank at a higher level through four pipes *h*, each having a vent pipe *l* extending above the level of the acid in the tank. The bottom of the saturator is flat and is provided with a radial slot *e* through which the salt is withdrawn by the injector *g* and lifted to the separator *h* in the usual manner.

Note.—Abstracts of the following specifications which are now accepted appeared in The Chemical Age when they became open to inspection under the International Convention: 128,939 (Nitrogen Corporation), relating to a process of synthesising ammonia, *see* Vol. I., p. 341; 146,455 (A. Wohl), relating to a process for converting cellulose-containing material into soluble carbohydrates, *see* Vol. III., p. 354.

International Specifications not yet Accepted

164,715. Oxyaldehydes. Soc. Chimique des Usines du Rhone (anciennement Gilliard, P. Monnet, et Cartier), 21, Rue Jean-Goujon, Paris. International Convention date, June 9, 1920.

Phenols or their derivatives are treated with formaldehyde and a nitroso compound, without an organic solvent, to produce oxyaldehydes. In an example, vanillin is obtained by treating guaiacol and formaldehyde with *p*-nitrosodimethylaniline in solution in hydrochloric acid.

164,719. Sodium Cyanide. Deutsche Gold-und Silber-Scheide-Anstalt vorm. Rössler, 7, Guttlenstrasse, Frankfort on Main, Germany. International Convention date, June 10, 1920.

The product obtained by fusing calcium cyanamide with sodium chloride contains sodium cyanide, sodium chloride, and alkaline earth compounds. The solution is treated with sodium sulphate or carbonate to precipitate the alkaline earth, and the solution is then concentrated to crystallise out the sodium chloride and leave the sodium cyanide.

164,731. CHROMIUM. E. Liebreich, 51, Joachim-Freidrich-strasse, Berlin. International Convention date, June 11, 1920.

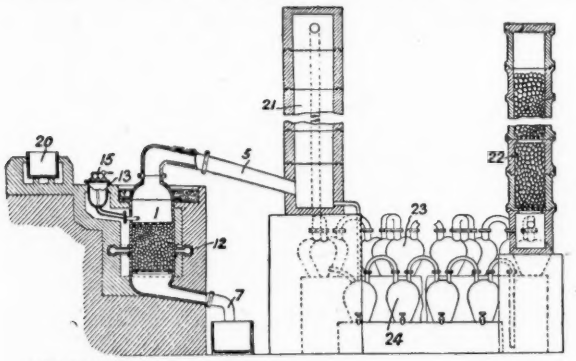
Solutions of caustic alkalis are added to solutions of chromium salts to produce alkali chromites, and these salts are then electrolysed to deposit chromium. The amount of alkali added is sufficient to dissolve the chromite.

164,734. OXIDES OF NITROGEN. Officine Elettrochimiche Dr. Rossi, and C. Toniolo, Legnano, Italy. International Convention date, June 12, 1920.

The gases obtained by the oxidation of ammonia are washed with nitric acid of less than 68 per cent. strength and are thus partly dehydrated. The gases, which may contain 1-19 per cent. of oxides of nitrogen, are then sprayed with liquid oxides of nitrogen in packed towers to complete the dehydration. If the gas is originally at 15°C. the dehydrated gas is cooled to −2° to −20°C., due to the evaporation of the liquid oxides of nitrogen. The purified gas is then cooled to −100°C. to liquefy it, in a refrigerating apparatus such as that used for condensing oxides of nitrogen which are obtained by oxidising nitrogen. The liquefied gas is partly used for dehydrating a further quantity of gas.

164,742. HYDROCHLORIC ACID AND CAUSTIC SODA. R. Volart y Jubany, 47, Paseo de Gracia, Barcelona, Spain. International Convention date, June 11, 1920.

Sodium chloride is dehydrated in the vessel 20 and then transferred to the vessel 13 and fused by hot waste gas from the furnace 1. Several vessels such as 13 are arranged around the chamber 1 and are charged and heated in succession, so



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that a constant supply of fused salt may be delivered to the furnace. The furnace is constructed of volcanic lava and is filled with pumice, while superheated steam is injected through the pipe 12. Hydrochloric acid and caustic soda are produced, and the acid gas is drawn off by the pipe 5 to the cooling tower 21. The gas then passes through absorbing towers 23, 24, 22, the latter being charged with coke and sprayed with water. The acid from the towers 24 is of strength 21-22°Bé. Caustic soda is drawn off through the steam-jacketed pipe 7.

164,757. TROPINE DERIVATIVES. E. Merck, 250, Frankfurterstrasse, Darmstadt, O. Wolfes, 49, Hoffmannstrasse, Darmstadt, and H. Maeder, 32, Wittmannstrasse, Darmstadt, Germany. International Convention date, June 16, 1920.

Acetone dicarboxylic ester, succindialdehyde, and methyl amine are condensed together to obtain tropinone dicarboxylic ester. This ester is boiled with alcoholic potash, acidified, and supersaturated with ammonia. The monocarboxylic ester is produced and is extracted with ether or chlorinated hydrocarbons.

LATEST NOTIFICATIONS

167,132. Method of and apparatus for deodorising gases. Maclachlan, A. July 28, 1920.

167,138. Process for making mortar, cement, and the like durable and reliable, so as to be suitable for use in stopping-up incursions of water or for waterproofing or hydraulic or other similar purposes. Winkler, K. July 26, 1920.

167,142. Heating and decanting apparatus for use in purifying the feed-water of steam generators. Kestner, P. July 27, 1920.

167,144. Process and device for cooling and liquefying air and other gases. Heylandt, Ges. Fur Apparatebau. July 28, 1920.

167,148. Manufacture of artificial fuel. Fournier, F.F. July 30, 1920.

167,151. Gas purifying compositions and their production. Mine Safety Appliances Co. June 5, 1920.

167,156. Manufacture of concentrated hydrogen peroxide solution. Man, W. July 26, 1920.

167,157. Process for the manufacture of allyl arsenic acid. Hoffmann-La Roche & Co., Akt.-Ges. F. July 26, 1920.

167,164. Reduction of magnesium compounds. Waldo, L. July 31, 1920.

167,171. Process for the recovery of sulphurous acid and heat, the waste gases from pulp boilers. Zellstofffabrik, Waldhof, Hangleiter, C., and Clemm, H. August 2, 1920.

167,185. Purification of gas. Klarding, N. July 28, 1920.

Specifications Accepted, with Date of Application

17,417/1914. Substances containing sulphur and new sulphur dyestuffs, Manufacture of. Ransford (*Cassella & Co.*). July 22, 1914.

141,374. Reactions between gases and liquids, Process and apparatus for causing. H. Frischer and M. Drees. October 29, 1917.

142,122. Cyanogen compounds, Manufacture of. H. Mehner. October 9, 1914.

143,850. Formate of ammonium from barium cyanide, Process for the production of. Norsk Hydro-Elektrisk Kvaelstofaktieselskab. May 26, 1919.

144,723. Pulverising-apparatus. J. E. Kennedy. February 2, 1918.

145,696. Ammonium sulphate from cyanogen compounds produced in the distillation of coal or organic substances. Process of producing. F. J. Collin, Akt.-Ges. zur Verwertung von Brennstoffen und Metallen. May 17, 1919.

147,740. Regenerative coke-ovens. Dr. C. Otto & Co. March 31, 1917.

150,709. Colour of the anthraquinone series, Manufacture of. R. B. Ransford (*L. Cassella & Co.*). September 1, 1920.

150,983. Coke ovens and the like. American Coke & Chemical Co. September 8, 1919.

161,175. Synthetically produced hydrocarbon oils. R. H. Brownlee. April 17, 1920.

166,657. Cane-sugar and rum-distilling industry, Recovery of potassium salts from waste products in. M. Bird. April 13, 1920.

166,659. Electric muffle furnaces. Automatic & Electric Furnaces, Ltd. L. W. Wild and E. P. Barfield. April 13, 1920.

166,695. Tin, Purification of. J. J. Collins. April 20, 1920.

166,727. Disinfectants from sulphurated shale oils, Manufacture of. H. Schaefer and G. Faber. April 26, 1920.

166,767. Cellulose derivatives, Manufacture of. H. Dreyfus. May 13, 1920.

166,818. Resin, Manufacture of. H. Wade (*Barrett Co.*). July 15, 1920.

Applications for Patents

Ballantine, W. B. Process for production of low-carbon ferro-chrome. 20,914. August 6.

British Dyestuffs Corporation, Ltd., Horsfall, R. S., and Jackson, H. Process for dyeing paper. 20,621. August 2.

Casanova, A. Liquid-hydrocarbon burning-apparatus. 20,669. 20,670. August 3.

Dandridge, A. G. Manufacture of dye-stuffs of the anthraquinone series. 20,682. August 3.

Klages, A. and Saccharin-Fabrik Akt.-Ges vorm Fahlberg, List & Co. Process for production of aromatic cyan mercury compounds substituted in the core. 20,758. August 4.

Lebeau, G. L. Apparatus for refrigeration of liquids, sterilisation, carbonisation, oxygenation, and iso-barometrical extraction. 20,862. August 5.

Lobell, W. Expression of vegetable oils from natural products containing same. 20,707. August 3. (British India, August 3, 1920.)

Macpherson, D. H. Use of titaniferous bauxites as filler for manufactured goods of vulcanized rubber. 20,552. August 2.

Reid, J. H. Reduction of ore and production of gas. 20,570. August 2.

,, T. A. Manufacture of carbonates of soda, &c. 20,740. August 4.

Rheinisch Nassauische Bergwerks-und Hütten-Akt.-Ges and Schüphans, G. Method of producing chemically-pure hydrochloric acid. 20,583. August 2. (Germany, August 16, 1920.)

Scottish Dyes, Ltd. and Thomas, D. Manufacture of dyestuffs of the anthraquinone series. 20,682. August 3.

Taplin, T. J. Treatment of ores containing oxidised copper compounds. 20,938. August 6.

Wild, A. H. Process for production of low-carbon ferro-chrome. 20,914. August 6.

Market Report and Current Prices

Our Market Report and Current Prices are exclusive to THE CHEMICAL AGE, *and, being independently prepared with absolute impartiality by Messrs. R. W. Greeff & Co., Ltd., and Messrs. Chas. Page & Co., Ltd., may be accepted as authoritative. The prices given apply to fair quantities delivered ex wharf or works, except where otherwise stated. The weekly report contains only commodities whose values are at the time of particular interest or of a fluctuating nature. A more complete report and list are published once a month. The current prices are given mainly as a guide to works managers, chemists, and chemical engineers; those interested in close variations in prices should study the market report.*

Market Report

THURSDAY, August 11, 1921.

There has been a distinctly better inquiry during the past week for the majority of heavy chemicals, although the turnover remains small. The outlook, however, is encouraging.

Export inquiry still remains very quiet and only a limited amount of business is reported.

ACETONE is in moderate request and the price firm.

ACID ACETIC is moving slowly.

ACID CITRIC remains uninteresting with price on the weak side.

ACID TARTARIC.—Fair quantities are offering from the Continent, and the price is without change.

BARIUM CHLORIDE continues dull.

BLEACHING POWDER.—This market is easier on Continental offerings.

COPPER SULPHATE shows no change.

FORMALDEHYDE is in moderate demand at last quoted prices.

LEAD ACETATE.—The enquiry for export is maintained, but little business is reported to have been concluded.

POTASH CARBONATE continues in buyers' favour.

POTASH BICHROMATE is uninteresting, and the price is inclined to be easier.

POTASH CAUSTIC is lower in the absence of demand.

SODIUM BICHROMATE is slightly easier, but demand is maintained.

SODA CAUSTIC continues in demand, and in the majority of cases buyers' idea of price cannot be entertained.

SODA PHOSPHATE is easier, with very little demand.

SODIUM PRUSSIATE.—Stocks are firmly held, but little business can be detected.

Coal Tar Intermediates

As indicated in our last issue, owing to the recent closing of works for the holidays, trade has continued on quiet lines, and there is no change to report in prices. As, however, most of the works reopened the beginning of the week inquiry has increased, and a certain number of orders have been placed.

ALPHA NAPHTHYLAMINE remains steady and the price is unchanged.

ANILINE OIL AND SALT have been inquired for, for home consumption.

BETA NAPHTHOL.—Little demand has been experienced, and the price is unchanged.

DIMETHYLANILINE is in fair demand at recent values.

DIPHENYLAMINE is featureless.

NITROBENZOL continues in demand at recent prices.

PARANITRANILINE has been inquired for, but little business has been placed owing to the recent increase in value.

RESORCIN continues firm, and orders have been booked.

SALICYLIC ACID is in small demand.

Coal Tar Products

Supplies of coal tar products continue to be difficult to obtain for prompt delivery.

90's BENZOL is very scarce, and is quoted at 3s. on rails for prompt delivery. For delivery in a month's time lower figures are indicated.

PURE BENZOL is quoted at 3s. 3d. per lb. on rails.

CREOSOTE OIL remains steady at 8¼d. on rails in the North and 8½d. in the South.

CRESYLIC ACID is slightly more active, the pale quality 97/9 per cent. being quoted at 2s. 4d. to 2s. 6d. and the dark quality 95/7 per cent. at 2s. to 2s. 3d.

SOLVENT NAPHTHA continues to be scarce, and is worth about 2s. 6d. to 2s. 8d. on rails.

HEAVY NAPHTHA is quoted at 2s. 6d.

NAPHTHALENE shows no change. Crude qualities are quoted at £8 to £11 per ton, while refined are worth £17 to £23 per ton.

PITCH.—The market is quiet, makers are firm in their ideas for forward delivery, and to-day's values can be taken at about 80/85 f.o.b. East Coast, and 75/80 f.o.b. West Coast.

Sulphate of Ammonia

The demand for home trade remains steady. For export slightly higher prices are asked for Spring delivery, and some business has been done at the increased prices.

Current Prices

Chemicals

	per	£	s.	d.		£	s.	d.
Acetic anhydride	lb.	0	2	3	to	0	2	6
Acetone oil	ton	92	0	0	to	95	0	0
Acetone, pure	ton	95	0	0	to	100	0	0
Acid, Acetic, glacial, 99-100%	ton	62	10	0	to	65	0	0
Acetic, 80% pure	ton	49	0	0	to	50	0	0
Arsenic	ton	100	0	0	to	105	0	0
Boric, cryst	ton	65	0	0	to	68	0	0
Carbolic, cryst. 39-40%	lb.	0	0	6½	to	0	0	7
Citric	lb.	0	2	4	to	0	2	5
Formic, 80%	ton	65	0	0	to	70	0	0
Gallic, pure	lb.	0	4	0	to	0	4	3
Hydrofluoric	lb.	0	0	8½	to	0	0	9
Lactic, 50 vol.	ton	35	0	0	to	37	10	0
Lactic, 60 vol.	ton	40	0	0	to	42	10	0
Nitric, 80 Tw.	ton	41	0	0	to	44	0	0
Oxalic	lb.	0	0	9	to	0	0	9½
Phosphoric, 1.5	ton	55	0	0	to	57	0	0
Pyrogallic, cryst	lb.	0	7	9	to	0	8	0
Salicylic, Technical	lb.	0	1	0	to	0	1	2
Salicylic, B.P.	lb	0	1	4	to	0	1	5
Sulphuric, 92-93%	ton	8	10	0	to	8	15	0
Tannic, commercial	lb.	0	3	6	to	0	3	9
Tartaric	lb.	0	1	5	to	0	1	6
Alum, lump	ton	18	0	0	to	18	10	0
Alum, chrome	ton	37	10	0	to	40	0	0
Alumino ferric	ton	9	0	0	to	9	10	0
Aluminium, sulphate, 14-15%	ton	12	0	0	to	13	0	0
Aluminium, sulphate, 17-18%	ton	15	0	0	to	16	0	0
Ammonia, anhydrous	lb.	0	2	2	to	0	2	4
Ammonia, .880	ton	43	0	0	to	45	0	0
Ammonia, .920	ton	30	0	0	to	32	10	0
Ammonia, carbonate	lb.	0	0	4	to		—	
Ammonia, chloride	ton	65	0	0	to	70	0	0
Ammonia, muriate (galvanisers)	ton	50	0	0	to	52	0	0
Ammonia, nitrate	ton	53	0	0	to	60	0	0
Ammonia, phosphate	ton	90	0	0	to	95	0	0
Ammonia, sulphocyanide	lb.	0	3	0	to	0	3	0
Amyl acetate	ton	420	0	0	to	425	0	3
Arsenic, white, powdered	ton	48	0	0	to	50	0	0
Barium, carbonate, 92-94%	ton	12	10	0	to	13	0	0
Barium, chlorate	lb.	0	0	11	to	0	1	0
Chloride	ton	16	0	0	to	17	0	0
Nitrate	ton	50	0	0	to	52	0	0
Barium Sulphate, blanc fixe, dry	ton	30	0	0	to	31	0	0
Sulphate, blanc fixe, pulp	ton	16	10	0	to	17	0	0
Sulphocyanide, 95%	lb.	0	1	6	to	0	1	0
Bleaching powder, 35-37%	ton	16	0	0	to		—	
Borax crystals	ton	32	0	0	to	35	0	0
Calcium acetate, Brown	ton	12	0	0	to	13	0	0
,, Grey	ton	19	0	0	to	21	0	0
Calcium Carbide	ton	29	0	0	to	30	0	0
Chloride	ton	12	10	0	to	13	0	0
Carbon bisulphide	ton	65	0	0	to	67	0	0
Casein, technical	ton	90	0	0	to	92	0	0
Cerium oxalate	lb.	0	3	9	to	0	4	0
Chromium acetate	lb.	0	1	2	to	0	1	4
Cobalt acetate	lb.	0	11	6	to	0	12	6
Oxide, black	lb.	0	16	0	to		—	
Copper chloride	lb.	0	1	3	to	0	1	6
Sulphate	ton	29	0	0	to	30	0	0

	per	£	s.	d.		£	s.	d.
Cream Tartar, 98-100%	ton	125	0	0	to	130	0	0
Epsom salts (*see* Magnesium sulphate)								
Formaldehyde 40% vol.	ton	92	10	0	to	95	0	0
Formusol (Rongalite)	lb.	0	3	9	to	0	4	0
Glauber salts, commercial	ton	5	10	0	to	6	0	0
Glycerine, crude	ton	70	0	0	to	72	10	0
Hydrogen peroxide, 12 vols.	gal.	0	2	8	to	0	2	9
Iron perchloride	ton	45	0	0	to	50	0	0
Iron sulphate (Copperas)	ton	4	0	0	to	4	5	0
Lead acetate, white	ton	47	10	0	to	50	0	0
Carbonate (White Lead)	ton	43	0	0	to	46	0	0
Nitrate	ton	50	0	0	to	52	0	0
Litharge	ton	38	10	0	to	40	0	0
Lithopone, 30%	ton	28	0	0	to	30	0	0
Magnesium chloride	ton	16	0	0	to	18	0	0
Carbonate, light	cwt.	2	15	0	to	3	0	0
Sulphate (Epsom salts commercial)	ton	10	10	0	to	11	10	0
Sulphate (Druggists')	ton	18	10	0	to	19	10	0
Manganese, Borate	ton	70	0	0	to	75	0	0
Sulphate	ton	70	0	0	to	75	0	0
Methyl acetone	ton	85	0	0	to	90	0	0
Alcohol, 1% acetone	ton	130	0	0	to	135	0	0
Nickel sulphate, single salt	ton	60	0	0	to	62	0	0
Nickel ammonium sulphate, double salt	ton	62	0	0	to	64	0	0
Potash, Caustic	ton	30	10	0	to	31	0	0
Potassium bichromate	lb.	0	0	9	to		—	
Carbonate, 90%	ton	40	0	0	to	42	10	0
Chloride	ton	38	0	0	to	40	0	0
Chlorate	lb.	0	0	5	to	0	0	5½
Meta bisulphite, 50-52%	ton	120	0	0	to	125	0	0
Nitrate, refined	ton	47	0	0	to	48	0	0
Permanganate	lb.	0	1	4	to	0	1	6
Prussiate, red	lb.	0	2	0	to	0	2	1
Prussiate, yellow	lb.	0	1	2½	to	0	1	3
Sulphate, 90%	ton	31	0	0	to	33	0	0
Salammoniac, firsts	cwt	3	5	0	to		—	
Seconds	cwt	3	0	0	to		—	
Sodium acetate	ton	25	0	0	to	26	0	0
Arsenate, 45%	ton	60	0	0	to	62	0	0
Bicarbonate	ton	10	10	0	to	11	0	0
Bichromate	lb.	0	0	6½	to	0	0	7
Bisulphite, 60-62%	ton	27	10	0	to	30	0	0
Chlorate	lb.	0	0	5½	to	0	0	5½
Caustic, 70%	ton	24	0	0	to	24	10	0
Caustic, 76%	ton	25	0	0	to	25	10	0
Hydrosulphite, powder, 85%	lb.	0	2	3	to	0	2	6
Hyposulphite, commercial	ton	15	0	0	to	16	0	0
Nitrite, 96-98%	ton	45	0	0	to	46	0	0
Phosphate, crystal	ton	25	0	0	to	27	0	0
Perborate	lb.	0	1	9	to	0	2	0
Prussiate	lb.	0	0	7	to	0	0	7½
Sodium Sulphide, crystals	ton	19	0	0	to	20	0	0
Sulphide, solid, 60-62%	ton	24	0	0	to	25	0	0
Sulphite, cryst.	ton	15	0	0	to	16	0	0
Strontium carbonate	ton	85	0	0	to	90	0	0
Strontium Nitrate	ton	84	0	0	to	90	0	0
Strontium Sulphate, white	ton	8	10	0	to	10	0	0
Sulphur chloride	ton	42	0	0	to	44	10	0
Sulphur, Flowers	ton	19	0	0	to	19	10	0
Roll	ton	19	0	0	to	19	10	0
Tartar emetic	lb.	0	1	8	to	0	1	9
Tin perchloride, 33%	lb.	0	1	3	to	0	1	6
Tin Perchloride, solid	lb.	0	1	6	to	0	1	9
Protochloride (tin crystals)	lb.	0	1	8	to	0	1	9
Zinc chloride, 102 Tw.	ton	22	0	0	to	23	10	0
Chloride, solid, 96-98%	ton	60	0	0	to	65	0	0
Oxide, 99%	ton	45	0	0	to	47	10	0
Dust, 90%	ton	90	0	0	to	92	10	0
Sulphate	ton	21	10	0	to	23	10	0

Coal Tar Intermediates, &c.

Alphanaphthol, crude	lb.	0	3	9	to	0	4	0
Alphanaphthol, refined	lb.	0	4	3	to	0	4	6
Alphanaphthylamine	lb.	0	2	9	to	0	3	0
Aniline oil, drums extra	lb.	0	1	6	to	0	1	7
Aniline salts	lb.	0	1	7	to	0	1	9
Anthracene, 85-90%	lb.		—		to		—	
Benzaldehyde (free of chlorine)	lb.	0	4	9	to	0	5	0
Benzidine, base	lb.	0	6	6	to	0	7	6
Benzidine, sulphate	lb.	0	7	0	to	0	7	6
Benzoic acid	lb.	0	2	3	to	0	2	6
Benzoate of soda	lb.	0	2	3	to	0	2	6
Benzyl chloride, technical	lb.	0	2	0	to	0	2	3
Betanaphthol benzoate	lb.	0	7	6	to	0	8	0
Betanaphthol	lb.	0	2	9	to	0	3	0
Betanaphthylamine, technical	lb.	0	9	6	to	0	10	0
Croceine Acid, 100% basis	lb	0	5	0	to	0	6	3

	per	£	s.	d.		£	s.	d.
Dichlorbenzol	lb.	0	0	9	to	0	0	10
Diethylaniline	lb.	0	6	9	to	0	7	6
Dinitrobenzol	lb.	0	1	5	to	0	1	6
Dinitrochlorbenzol	lb.	0	1	5	to	0	1	6
Dinitronaphthaline	lb.	0	1	6	to	0	1	8
Dinitrotoluol	lb.	0	1	8	to	0	1	9
Dinitrophenol	lb.	0	3	0	to	0	3	3
Dimethylaniline	lb.	0	4	0	to	0	4	3
Diphenylamine	lb.	0	4	6	to	0	4	9
H-Acid	lb.	0	9	0	to	0	10	0
Metaphenylenediamine	lb.	0	5	9	to	0	6	0
Monochlorbenzol	lb.	0	0	10	to	0	1	0
Metanilic Acid	lb.	0	7	6	to	0	8	0
Monosulphonic Acid (2:7)	lb.	0	7	6	to	0	8	0
Naphthionic acid, crude	lb.	0	4	0	to	0	4	3
Naphthionate of Soda	lb.	0	4	3	to	0	4	6
Naphthylamin-di-sulphonic-acid	lb.	0	5	0	to	0	5	6
Nitronaphthalene	lb.	0	1	5	to	0	1	6
Nitrotoluol	lb.	0	1	4	to	0	1	5
Orthoamidophenol, base	lb.	0	18	0	to	1	0	0
Orthodichlorbenzol	lb.	0	1	1	to	0	1	2
Orthotoluidine	lb.	0	2	3	to	0	2	6
Orthonitrotoluol	lb.	0	0	10	to	0	1	0
Para-amidophenol, base	lb.	0	12	6	to	0	13	0
Para-amidophenol, hydrochlor	lb	0	13	0	to	0	13	6
Paradichlorbenzol	lb.	0	0	7	to	0	0	8
Paranitraniline	lb.	0	4	6	to	0	4	9
Paranitrophenol	lb.	0	2	9	to	0	3	0
Paranitrotoluol	lb.	0	5	9	to	0	6	0
Paraphenylenediamine, distilled	lb.	0	12	6	to	0	13	6
Paratoluidine	lb.	0	7	6	to	0	8	0
Phthalic anhydride	lb.	0	3	9	to	0	4	0
Resorcin, technical	lb.	0	7	0	to	0	7	6
Resorcin, pure	lb.	0	7	6	to	0	8	0
Salol	lb.	0	2	9	to	0	3	0
Sulphanilic acid, crude	lb.	0	1	4	to	0	1	6
Tolidine, base	lb.	0	8	6	to	0	10	0
Tolidine, mixture	lb.	0	2	9	to	0	3	0

New Products from Coal Tar

THE ramifications of the coal-tar industry are still further exemplified by developments in two new directions, namely, in the manufacture of a camphor substitute, and of synthetic tanning agents or "Syntans." In the case of the former, large quantities of tri-phenyl phosphate and smaller quantities of tri-cresyl phosphate have been made in America during 1920, and have proved excellent substitutes for the natural Japanese laurel camphor in the manufacture of pyroxylin and celluloid. Although there can be little hope of the use of these coal-tar derivatives as camphor substitutes in general application.—they are in no way competitive with the synthetic camphor produced from oil of turpentine, nor with the so-called artificial camphor (pineme hydrochloride),—their successful use in the manufacture of pyroxlyin has helped very considerably to break the Japanese monopoly in camphor. The high prices demanded by the Japanese producers have stimulated research in the direction of finding substitutes and of producing true synthetic camphor economically. The new synthetic camphor plants in the U.S.A. and the replacement of the large quantities of camphor annually used in the pyroxylin industry by coal-tar derivatives, should effectively break monopolistic interests.

The shortage of natural tanning agents, too, has stimulated the production of synthetic tannins. "Syntans" vary widely in constitution, but are generally produced from mono- or poly-hydroxyl phenols, homologues or derivatives, easily obtained from coal tar. The phenol, after conversion into a soluble sulphonic-acid derivative, is condensed with the aid of some substance having the power of abstracting the elements of water, as, for instance, formaldehyde. Many varieties of synthetic tannins can, therefore, be produced from coal tar as a base.

Grasser, in his treatise on synthetic tannins, describes other "syntans," but recent patent applications are all concerned with tannins prepared according to the above general scheme.

According to *Drug and Chemical Markets*, Henry Ford's offer for the United States Government NITRATE PLANT at Muscle Shoals, Alabama, has been rejected by the Secretary of War. The Secretary explained that the Ford proposal was based on the assumption that the Government would guarantee the Wilson dam to produce 600,000 H.P., and stated that it would be impossible to accept the offer on that basis.

Company News

CHEMICAL & METALLURGICAL CORPORATION.—A report of the first annual general meeting, held on Tuesday at River Plate House, E.C., appears on another page.

DELTA METAL CO.—Owing to the effect of the coal strike and the abnormal conditions prevailing since the early part of this year, the directors cannot recommend the payment of an interim dividend on account of 1921. Last year a dividend of 5 per cent. was paid.

LIMMER & TRINIDAD LAKE ASPHALTE CO.—The directors announce an interim dividend at the rate of 15 per cent. per annum, less tax, on the ordinary and preference shares for the half-year payable yesterday (Friday). The same dividend was paid last year.

ABERTHAW & BRISTOL CHANNEL PORTLAND CEMENT CO.—An interim dividend at the rate of 14 per cent. per annum, free of tax, has been declared on the ordinary shares for the half-year and is payable on September 1. Last year, dividend same.

SAN PATRICIO NITRATE CO.—The net profit for 1920 amounted to £9,075, and a dividend of 1s. per share free of tax has been declared leaving to be carried forward £4,075. The oficina still remains closed, and due attention is being given to its upkeep. Meeting, 27, Leadenhall Street, E.C., August 15, at 2.30 p.m.

PERUVIAN GOVERNMENT (SALT) LOAN.—Messrs. J. Henry Schröder & Co. announce, in regard to the Peruvian Government 5½ per cent. (Salt) Loan, 1909, that the half-yearly interest, due on August 15, and the drawn bonds for £16,220, the numbers of which have already been announced, will be payable on that and any succeeding day at 145, Leadenhall Street, E.C., between 11 a.m. and 2 p.m.

W. J. BUSH & Co.—The net profit for 1920 was £44,210 and £38,161 was brought in, making £82,371. A dividend of 5 per cent. is to be paid on the ordinary shares and £63,621 remains to be carried forward (subject to Excess Profits Duty for 1919 and 1920, and Corporation Profits Tax). Meeting, Institute of Chartered Accountants, Moorgate Place, E.C., August 18, noon.

MOND NICKEL CO., LTD.—At the annual meeting held on August 5 the following dividends were declared: To the holders of the 500,000 cumulative preference shares and the 2,000,000 non-cumulative preference shares of £1 each, a dividend at the rate of 7 per cent. per annum for the year ended April 30 last including the interim dividend paid on March 3, subject to income tax, and a dividend to the holders of the 900,000 ordinary shares of 1s. per share, free of tax. An account of the meeting appears on another page.

WELSBACH LIGHT CO.—After writing down stock to meet depressed market conditions, the accounts to March 31 last show a net profit of £13,135, subject, on the one hand, to liability for corporation profits tax, and *per contra*, to any claim the company may have for repayment in respect of excess profits duty. To this £13,135 is added £21,344 brought in, making £34,479. From this is to be paid a dividend of 5 per cent. (less tax), leaving to be carried forward, £21,583. Meeting, Winchester House, August 16, 11.30 a.m.

BROKEN HILL PROPRIETARY, BLOCK 10.—The report for the half-year to March 31 last states that the only revenue derived during the period consisted of small payments on account of realisation of lead and zinc concentrates during previous periods, and interest on war loans, &c. The working account shows a loss of £15,953, and, after bringing this into profit and loss account, a total loss is shown for the half-year of £18,800, reducing the balance brought forward from previous periods from £62,256 to £43,455, which is carried forward.

RENNER TANNING & DYE WORKS CO.—An extraordinary general meeting of the H. Renner Tanning & Dye Works Co., of Hamburg, has been called for September 12 to consider a proposal to transfer the business to the Forestal Land, Timber & Railways Co., Ltd., of Leadenhall Street, E.C. 3. THE CHEMICAL AGE was informed by the latter company that they have offered to purchase the ordinary shares at the rate of 525 per cent. per Renner share of 1,000 marks. They have also offered to buy the preferred shares at par.

PRVE RUBBER & COCONUT CO.—The profit for the year to March 31 last was £3,295, and £1,518 was brought in. The available balance is £3,605, which the directors recommend be carried forward. Rubber crop (partly restricted), 205,440 lb. against estimate 270,000 lb. Estimate for current year 202,000 lb., subject to modification. The number of coconuts harvested was 1,254,607, against estimate 1,600,000 The quantity of copra manufactured was 4,378 piculs (5,254 cwt.). The Directors have decided to redeem £280 of debenture stock at par. The result of the drawing will be duly notified to the debenture stock holders concerned. Meeting, Mincing Lane House, 59, Eastcheap, E.C., August 15, noon.

BROKEN HILL PROPRIETARY, BLOCK 14.—The report for the half-year to March 31 last states that the production of lead and zinc concentrates, together with carbonate ore produced during the short period of operation, has been taken into working account at a conservative valuation. Payments on account of realisation on lead and zinc concentrates produced during previous periods are also included. The working account shows a loss of £16,063, and, after crediting profit and loss account with interest on investments and providing for depreciation, a total loss remains of £17,672. In March last the half-yearly interest on preference shares, amounting to £1,500, was paid. The balance to credit of profit and loss brought in from the previous period, £48,614, was therefore reduced to £29,442 which is carried forward.

Chemical Trade Inquiries

The following inquiries, abstracted from the "Board of Trade Journal," have been received at the Department of Overseas Trade (Development and Intelligence), 35, Old Queen Street, London, S.W.1. British firms may obtain the names and addresses of the inquirers by applying to the Department (quoting the reference number and country), except where otherwise stated.

LOCALITY OF FIRM OR AGENT	MATERIALS.	REF. NO.
Budapesth ...	Chemicals	111
Naples ...	Mineral oils; naphtha and anti-corrosive paints	112
Hongkong ...	Glassware	115
Santiago or Valparaiso	Drugs; chemists' sundries ...	118
Winnipeg ...	Lubricants; glassware; chemicals; dyes; glues	—
New Zealand	Glassware	—
Buenos Aires	Glassware	—
Buenos Aires	Sulphuric acid; aluminium sulphate. Replies to the Dept. of Overseas Trade, 35, Old Queen Street, London, S.W.1.	—

Tariff Changes

INDIA.—Unmanufactured mica has been exempted from the payment of the import duty leviable under the Indian Tariff Act, 1894, as amended.

BELGIUM.—The exportation of chemical manures remains subject to control.

FRENCH COLONIES.—The schedule of duties levied on exports from the French Establishments in Oceania imposes a duty of 1.50 fr. per metric ton of phosphate of lime, 4 fr. per 100 litres of coconut oil, and 40 centimes per kilo. on vanilla.

GREECE.—All Customs duties are to be paid in gold drachmæ or bank notes, the gold drachma being considered as equivalent to 2 drachmæ 50 lepta paper.

MEXICO.—Modifications in the export duties on petroleum and its derivatives were published in the Board of Trade *Journal* (August 4, pp. 140 and 141).

SERB-CROAT-SLOVENE STATE.—A revised Customs tariff which supersedes all previous ones took effect from July 16.

TUNIS.—The export of oilcake made from oleaginous seed is now liable for duty at the rate of 5 fr. per 100 kilogs. (gross weight) for edible oilcake, and of 1 fr. per 100 kilogs. (gross weight) on other oilcake. The export restrictions on aluminium ores (bauxite), iron ore (including residues from the smelting of pyrites), margarine, oleo-margarine, edible fats, and similar substances, and edible vegetable fats are removed as from June 15.

UNITED STATES OF AMERICA.—A proposed new Customs tariff for the United States of America was published on August 4 (6d. net) as a Supplement to the Board of Trade *Journal*.

TRADE GUIDE

CHEMICAL AGE

THE Trade Guide is a compact and handy form of reference to a representative list of firms engaged in various branches of the Industry. In most cases fuller particulars may be found by referring to the displayed advertisement elsewhere.

Analytical Reagents

THE BRITISH DRUG HOUSES LIMITED — BDH — LONDON

Research Chemicals
THE BRITISH DRUG HOUSES, LTD.,
Graham St., City Rd.,
LONDON, E.C.

Asbestos

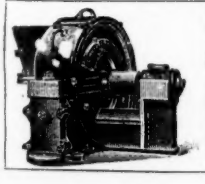
Pioneers of the World's Asbestos Industry
BELL'S UNITED ASBESTOS Co., Ltd.
Southwark Street, LONDON, S.E.1
(Established 1871)

Balances

Oertling
LONDON

Chemical Plant

BENNETT SONS & SHEARS, Ld.
43, SHOE LANE,
LONDON, E.C.4.



CHRISTY & NORRIS.
CHELMSFORD LTD. (England),
Specialise in
GRINDING MACHINERY FOR ALL MATERIALS
Send for Catalogue,
State Requirements.

Centrifuges
Autoclaves
Sterilizers, etc.
CHARLES HEARSON & Co., Ltd.
WILLOW WALK, BERMONDSEY, S.E.

Carbons

NORIT.
THE decolorising carbon and Refining Agent.
30 Times adsorptive capacity of bone char.
In five grades.
JOSEPH BAKER SONS & PERKINS LTD.,
Head Offices: KINGSWAY HOUSE, KINGSWAY, W.C.2
Telegrams: "Bakers, London."

Disinfectants

ALL GRADES, PERCENTAGES AND CO-EFFICIENTS
ALSO
LIQUID SOAPS
W. GARDINER & CO.
83, Broad Street, Camlachie, Glasgow

Drums and Tins

JOHN FEAVER,
TOWER BRIDGE ROAD, S.E. 1.
TINS for
PRESERVED PROVISIONS and FOODSTUFFS,
CANS for VARNISH, PAINT.
DRUMS & TAPERS for OILS, VARNISH.
Samples and Prices on application.

Essential Oils

VIOFLOR REG.
Covers Objectionable Smells in Manufacture of White Spirit Turpentine Substitutes, etc.
CREPIN & DOUMIN, Ltd.
15, COOPERS ROW, E.C.3

Evaporators

KESTNER PATENT
EVAPORATORS
ACID ELEVATORS
FANS
EXTRACTORS
CRYSTALLIZERS
Kestner Evaporator & Engineering C. Ltd
5 Grosvenor Gardens, Westminster, S.W.1.

MULTIPLEX AND SIMPLEX FILM EVAPORATORS.
DISTILLING PLANT.
DRYING PLANT. OIL HARDENING PLANT.
BLAIR CAMPBELL & McLEAN LTD GLASGOW
MAKERS OF ALL TYPES OF CHEMICAL PLANT.

Filterpresses

P.F.C. — THE RESULT OF 60 YEARS EXPERIENCE
PREMIER FILTERPRESS Co. LTD.
FINSBURY PAVEMENT HOUSE, LONDON, E.C.2

Furnaces

Cut your Fuel Costs *by adopting*
Wilton's (1920 *Pat.*) **Furnaces**
Oil Burners can be fitted
Write for Booklet:—
Chemical Eng. & Wilton's Pat. Furnace Co., Ltd. (Dept. C.A.F.)
76, Victoria St., London, S.W.1. Victoria 2417

General Chemicals

CHEMICALS, FERTILISERS
TAR & AMMONIA PRODUCTS
CHAS. PAGE & Co. LTD.
47-51, KING WILLIAM ST. LONDON, E.C.

Glassware

SCIENTIFIC GLASS WARE — DURO GLASS R LONDON — 92 FORE ST. LONDON, E.C.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

London Gazette

Bankruptcy Information

JOWETT, FRANK THORNTON, 14, Cannon Place, Brighton, formerly trading as the City & Midland Manufacturing Co., and lately carrying on business at 31A and 33, Broad Street House, in the City of London, manufacturing chemist's salesman. First meeting, August 16, 2.30 p.m., official receiver's offices, 12A, Marlborough Place, Brighton. Public examination, October 5, 11 a.m., Court House, Church Street, Brighton.

Companies Winding Up

METALLIC CHEMICALS, LTD., 11 and 12, Finsbury Square, in the City of London. First meeting of creditors, August 17, 11.30 a.m., 33, Carey Street, Lincoln's Inn, W.C. 2.

FREESE & MOON, LTD.—First meeting, Friday, August 12, 1921, at 12 noon, at the offices of Chantrey, Button & Co., 61-62, Lincoln's Inn Fields, London, W.C. 2. Statements of claim to the Liquidator, Howard Button, C.B.E., Chartered Accountant, 61 and 62, Lincoln's Inn Fields, London, W.C. 2.

Liquidators' Notices

STANWELL CHEMICAL WORKS, LTD. (in voluntary liquidation).—Final meeting will be held to receive report of the liquidator, 9, King's Bench Walk, Temple, E.C.4, September 12, 3.30 p.m. Arthur F. Sharp, Liquidator.

SHEPPARD'S CHEMICAL WORKS, LTD. (in voluntary liquidation).—Final meeting to receive report of the liquidator, 9, King's Bench Walk, Temple, E.C.4, September 12, 3 p.m. Arthur F. Sharp, Liquidator.

Mortgages and Charges

[*NOTE.—The Companies Consolidation Act, of 1908, provides that every Mortgage or Charge, as described therein, created after July 1, 1908, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every Company shall, in making its Annual Summary, specify the total amount of debts due from the Company in respect of all Mortgages or Charges which would, if created after July 1, 1908, require registration. The following Mortgages and Charges have been so registered. In each case the total debt, as specified, in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced since such date.*]

BRITISH CELLULOSE & CHEMICAL MANUFACTURING CO., LTD. (late British Cellulose & Chemical Manufacturing (Parent) Co., Ltd.), London, S.W.—Reg. July 28, £8,000 debentures, part of £500,000; general charge; also reg. July 29, £128,000 debentures, part of £500,000; general charge. *Nil. December 23, 1920.

C.V.O. CHEMICAL WORKS (1919), LTD., London, W.C.—Reg. July 25, £5,000 debentures (filed under sec. 93 (3) of the Companies (Consolidation) Act, 1908), present issue £2,300; general charge. *£7,000. December 31, 1920.

Satisfaction

CHESHIRE GLUE & CHEMICAL CO., LTD., Sandbach.—Satisfaction reg. July 22, all moneys, &c., reg. August 13, 1920.

County Court Judgment

[*NOTE.—The publication of extracts from the "Registry of County Court Judgments" does not imply inability to pay on the part of the persons named. Many of the judgments may have been settled between the parties or paid. Registered judgments are not necessarily for debts. They may be for damages or otherwise, and the result of bona-fide contested actions. But the Registry makes no distinction of the cases. Judgments are not returned to the Registry if satisfied in the Court books within twenty-one days. When a debtor has made arrangements with his creditors we do not report subsequent County Court judgments against him.*]

COPESTAKE, Mr. F. H., 116, Betchworth Road, Seven Kings, chemical merchant. £30 18s. 4d. June 8.

New Companies Registered

The following list has been prepared for us by Jordan & Sons, Ltd., company registration agents, 116 and 117, Chancery Lane, London, W.C.2:—

ARTHOL MANUFACTURING CO., LTD., manufacturers of synthetic perfumes and essential oils of all kinds. Nominal capital, £25,000 in 25,000 ordinary shares of £1 each. Directors: J. F. Barvoets, R. F. Morris (managing directors). Qualification of directors, one-fourth of the issued capital.

BELL, J. C. & CO., LTD., 188, Aston Road, Birmingham. Oil, colour and lead merchants. Nominal capital, £10,000 in 9,000 ordinary shares of £1 each and 1,000 preference shares of £1 each. Directors: J. C. Bell, G. F. Godridge. Qualification of directors, 500 ordinary shares.

BIRMINGHAM STARCH & MANUFACTURING CO., LTD., Wellhead Starch Works, Perry Barr, Birmingham. Manufacturers of starch, &c. Nominal capital £100,000 in 100,000 shares of £1 each. Directors: G. S. Brighten, H. S. Kyrke-Smith. Qualification of directors, £100.

BLUE BAND CO., LTD., 32, Seething Lane, E.C. 3, general merchants and manufacturers of margarine. Nominal capital, £100 in 100 shares of £1 each. Directors: E. H. Blank, A. G. Hales.

CARTLIDGE BROTHERS, LTD., 36A, Darlington Street, Wolverhampton. Oil merchants and refiners. Nominal capital, £5,000 in 1,000 preference shares and 4,000 ordinary shares of £1 each. Directors: J. H. Cartlidge, L. Cartlidge. Qualification of directors, £250. Remuneration of directors, £100 each.

CASEIN (INDUSTRIES), LTD., The Culvert Works, Sheepcote Lane, Battersea, S.W.11. Manufacturing and dealing in casein products and glue of every description. Nominal capital, £5,007 in 5,000 preference shares and 7 ordinary shares of £1 each. Directors: H. H. Langston-Jones, D. Michie, C. C. Clark, H. C. Dutton. Qualification of directors, 1 share.

CLAYTON LIME & LAND CO., LTD. To purchase or otherwise acquire lands having lime or other waste deposits thereon and turn same to account. Nominal capital, £100 in 100 shares of £1 each. Directors to be appointed by subscribers. Qualification of directors, one share. Remuneration of directors to be voted by company in general meeting. Subscribers: B. C. Sellers, T. H. Bazley, A. Henderson.

DYMOND TAR CHEMICALS & FUELS, LTD., Headlands Works, Liversedge. Tar and chemical manufacturers. Nominal capital £30,000 in 30,000 shares of £1 each. Directors: H. P. Hird, F. D. Richmond, J. Haigh, W. Glossop, H. A. Glover, C. S. Hays, R. Yielding. Qualification of directors, 100 shares. Remuneration of directors, to be voted by Company.

FAIRBANK KIRBY (GRIMSBY), LTD., 385, Cleethorpe Road, Great Grimsby. Wholesale manufacturing chemist, cold liver oil and cod liver oil emulsion manufacturer. Nominal capital, £5,000 in 5,000 shares of £1 each. Directors: F. Kirby, E. A. F. Kirby, V. F. Kirby, F. Kirby, J. W. Croft. Qualification of directors, £250.

McINNES COMPOSITIONS CO. (1921), LTD.—Anti-corrosive and anti-fouling compositions and paint manufacturers and merchants. Nominal capital, £50,000 in 40,000 preference shares of £1 each and 40,000 ordinary shares of 5s. each. Directors to be appointed by subscribers. Qualification of directors, one share. Remuneration of directors, £100 each. Subscribers: F. M. B. Fisher, G. N. Reeves.

OZO, LTD. 93, Commercial Road, Southampton. Manufacturing soap, &c. Nominal capital £5,000 in 3,000 preference shares of £1 each and 2,000 ordinary shares of £1 each. Directors: A. Smith and R. A. Woodward. Qualification of directors, £500.

PAUL JACKSON, LTD., 18, Sackville Street, Piccadilly, W. Manufacturers and dealers in table glass ware and all other kinds of glass. Nominal capital, £1,000 in 1,000 shares of £1 each. Qualification of directors, 1 share. Directors: To be appointed by subscribers, £1 each.

TRADE GUIDE

CHEMICAL AGE

Heavy Chemicals

HEAVY CHEMICALS
OF
ALL DESCRIPTIONS

HAMILTON, SON & CO.,
Ironia Chemical Works,
Lilybank Road, Glasgow.

'Phone: South 542. 'Grams: "Ironia," Glasgow.

Instruments

BRISTOL'S
RECORDING
GAUGES &
THERMOMETERS
J.W. & C. J. PHILLIPS, LTD.
23, College Hill, London, E.C.4

Oil and Fuel

ANGLO'S FUEL OIL
For
Steam Raising: Diesel
& Semi Diesel Engines &c.
ANGLO AMERICAN OIL Co. LTD

THE Trade Guide will undoubtedly be found of great assistance by buyers; should any information be required which cannot be found herein a request to the "Chemical Age" Business Manager will bring a ready response.

Oil and Fuel—(*Continued*)

BRITISH OIL & FUEL CONSERVATION.
FREEMAN MULTIPLE RETORT.
FREEMAN PRECISION TEMPERATURE CONTROL.
Telephone:— Museum 6468. 9, SOUTHAMPTON ST., HOLBORN, W.C.1.

Oil and Fuel—(*Continued*)

BENZOL By S. E. WHITEHEAD—its Recovery, Rectification, and Use. 210 pages, 8¾in. × 5½. With introduction by the RT. HON. LORD MOULTON. Price 13/3, post free.

BENN BROTHERS LTD.
8, BOUVERIE STREET, LONDON, E.C.4

Steam Fittings

1855 CRANE 1921
Everything for any Pipe Line
CRANE-BENNETT LTD.
45/51, Leman St., London, E.1.
Branches:
MANCHESTER, BIRMINGHAM, LEEDS, GLASGOW.
Works: IPSWICH.

Sulphur

PRICE, STUTFIELD & CO., LTD.,
6, FENCHURCH BUILDINGS,
LONDON, E.C.3.

Sublimed Flowers.
Commercial Flowers. Fine Ground.
Refined Roll. Refined Rock.
Rough—99/99·5% American.

ROCK HILL CHINA CLAY CO., LTD., Stenalees, St. Austell, Cornwall. Producers and manufacturers of china clay, &c. Nominal capital £36,000 in 36,000 shares of £1 each. Directors: A. M. Richards, S. H. B. Richards, W. T. Richards, R. H. Richards, F. M. Richards, J. W. Williams. Qualification of directors, £200. Remuneration of directors, one guinea each meeting attended.

RUBBER CLUB OF GREAT BRITAIN, LTD. To promote the cause of the Rubber and Allied Industry of Great Britain. Every member to contribute a sum not exceeding £2 if necessary. Directors: A. B. Cook, J. H. Chilcote, and G. E. Watson and seven others.

Patents in Canada

A NEW Canadian Patent Act received assent on June 4, 1921. Amongst other provisions, it introduces new fees for patents, the amounts fixed being $15 on filing the application, and $20 on the grant of the patent. The fee for re-issue of a patent after surrender is $30.

A failure to make or import a patented article during the war period, between August 1, 1914, and January 10, 1922, will not render a patent void, and any fees which were payable after August 1, 1914, may be paid up to the year from the coming into force of the Act. In the case of patents which have lapsed through non-payment of fees, British subjects and subjects of other countries which grant reciprocal privileges may restore their patents under this section of the Act.

Provision is also made for allowing applications for patents in respect of which application has been made in a foreign country during the war period.

Lever Brothers and American Companies

THE *Financial Times* states that the failure of the negotiations between Lever Brothers, Ltd., and the American Linseed Company has been followed by discussions with the Palmolive Company, which is reputed to manufacture the largest selling brand of toilet soap in the world. The officials of this company decline either to confirm or deny the statement that a fusion is contemplated, but they admit that conversations have taken place. The Palmolive Company does not issue reports regularly, but announcements respecting its business have appeared from time to time. It has an authorised capital of $5,000,000 and $1,726,800 in 7 per cent. cumulative preferred, and $1,804,300 in common stock have been issued. There is also outstanding $1,273,200 five-year convertible notes. The gross sales in 1907 were $801,000, but had jumped to $5,668,300 in 1917, to $8,554,400 in 1918, and to $13,958,300 in 1919. For 1920 they were expected to be $20,000,000. The net profit in 1917 was $627,100, in 1918 $395,100 and in 1919 $594,700. The headquarters of the Palmolive Company are at Milwaukee, but it also has factories at Portland in Oregon, and at Toronto in Canada.

As evidence of the rapid growth in the Dutch East Indies of the VEGETABLE OIL INDUSTRY, it is stated that within a short time all refining of vegetable oils produced in the colonies will be done at home, where formerly large shipments of oliferous seeds went to other parts to be crushed. At present there are in Java 14 factories. About 95 per cent. of the total East Indian production consisted of coconut oil, of which 300,000 tons were produced in 1920. Over 66,000 tons of vegetable oils from the Dutch East Indies were shipped through the Suez Canal during 1920.

TARIFF.

Agencies.
Businesses—Sale & Wanted.
Machinery, Plant, etc., for Sale.
Miscellaneous — Sales and Wants.
Partnerships. Patents.
Public Appointments.
Road Transport.
Situations Vacant.
1d. per word, minimum 2s.; 3 insertions for price of two.

WANTS
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Chemical Age
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Tariff (cond.)

Situations Wanted.
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Contracts and Tenders.
Legal Notices.
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MACHINERY, PLANT, &c. FOR SALE

DISINTEGRATORS, Crushing and Sifting Machinery for Drugs, Chemicals, Barks, Roots, Crystals, &c. Please apply to makers for catalogue.—CHRISTY & NORRIS, LTD., Chelmsford, England.

FILTER PRESSES, good second-hand, 18 and 27 in. plates. Can be inspected at our works, or full particulars posted per return.—R. W. ANDREWS & Co., 148-150, Pentonville Road, London, N.1.

FOR IMMEDIATE SALE, at 20 per cent. below selling price owing to customer being unable to take up delivery, a new SOAP AND GLYCERINE PLANT, ready for immediate despatch, output 20 tons weekly. Price, in London, £4,750 net.—Apply, SCOTT'S, Kingsway House, London, W.C.2.

FOR IMMEDIATE SALE AND DELIVERY.

Two splendid STEAM JACKETED WELDED STEEL MIXING PANS, 7 ft. diameter by 10 ft. deep, ⅜ in. plate, slide valve at bottom 18 in. by 9 in. Fitted with double bevel gear mounted on ball bearings for reverse driving, fast and loose pulleys.
One nearly new C.I. JACKETED ENAMEL LINED SULPHONATOR, with agitating gear and enamel stirrer, about 4 ft. 3 in. diameter by 5 ft 6 in. high.
Seven new SILICA COILS, about 3 ft. diameter by 3 ft. 6 in. high, the coil being about 2½ in. diameter.
One 2 in. DRUM PUMP.
One new C.I. JACKETED AUTOCLAVE, with agitating gear, pressure 200 lb. per square inch, by Forshaw, of Warrington.
One strongly built AIR RECEIVER, 3 ft. 9 in. long by 21 in. diameter.
—Full particulars and price on application to RICHARD SIZER, LTD., Wilmington, Hull.

GRINDING MILL, Dressing Machine, Crushing Rolls, Double Elevator, 20-ft. centres, Roller Mill, Millstones and Millstones & Hursting, Vertical Boiler, Gas Engine, Shafting Pulleys and Bearings; Dust Collector and Fan: Brush Sifter, Mixing Machine. All good working order, low price.—Particulars from READWIN, 134, High Street, Cheshunt, Herts

ONE VERTICAL BELT-DRIVEN AIR COMPRESSOR, by the American Well Works Co., 9 in. diam. cylinder × 9-in. stroke, 100 cubic ft. at 125-lb. pressure; one ditto, single acting cylinder 7 × 7-in. stroke, 50 cubic ft. at 60-lb. pressure; one ditto, by Bailey, 3-in. diam. × 4 in. stroke, belt-driven, with receiver.—C. F. DAVIS, 22, Billiter Street, London, E.C.

ONE BELT-DRIVEN HYDRO EXTRACTOR, having 42-in. gutta-percha basket; one 30-in. Overdriven Hydro Extractor, suspended type, belt driven.—C. F. DAVIS, 22, Billiter Street, London, E.C.

ONE MILD-STEEL AUTOCLAVE, fitted with agitating gear, pan, 2-ft. diam. × 2 ft. 5 in. deep, in oil bath, for gas heating, for 350-lb. working pressure.—C. F. DAVIS, 22, Billiter Street, London, E.C.

ONE ENAMELLED PAN, enclosed, 3 ft. 9 in. diam. × 2 ft. 6 in. deep, built of ¼-in. metal, new.—C. F. DAVIS, 22, Billiter Street, London, E.C.

ONE JACKETED MIXING PAN, 4 ft. 9 in. diam. × 5 ft. 6 in. deep, ¼-in. steel plate, 3-in. centre outlet fitted with mixing gear for belt drive; 60-lb. working pressure; one C.I. ditto, 2 ft. 2 in. × 2 ft., 4-in. C.I., double mixers fast and loose pulleys.—C. F. DAVIS, 22, Billiter Street, London, E.C.

ONE STEEL-JACKETED PAN, 6 ft. diam. × 5 ft 9 in. deep, angle iron round top, ½-in. plate, 80-lb. working pressure; one ditto, 3 ft. 5 in. × 3 ft. 5 in., ⅜ in. plate, 60 lb. working pressure; one ditto, 2 ft. 8 in. × 2 ft. 7 in., ¼-in. plate, 50-lb. working pressure.—C. F. DAVIS, 22, Billiter Street, London, E.C.

RAILWAY TANK WAGONS FOR DISPOSAL rectangular and cylindrical, specially suitable for oil, inflammable liquids, also acids.—Inquiries invited.—BROTHERTON & Co., LTD., Leeds.

TILTING PAN (Low & Duff), copper, high-pressure steam jacket and copper lid, about 45 galls., nearly new, £40, cost double. Portable gas coppers, 25, 40 and 50 galls., £3 to £6.—MCKENZIE & Co., 26-7, Holland Park Mews, London, W.11.

MACHINERY PLANT, &c., FOR SALE—*continued*

TURN TO B.W.S. ANNOUNCEMENT ON PAGE XV.

VACUUM DRYER (new), with 10 shelves, 42in. × 42in.; spaces between, 2½ in.; Vertical Tubular Condenser and Receiver. Cheap for quick sale.—BOX 254, CHEMICAL AGE Office, 8, Bouverie Street, E.C.4.

2 AMERICAN WATER COOL MILLS (Kent's) for Sale, suitable Tube Colours and Coach Paints.—HALL'S PAINT WORKS, Broughton, Manchester.

PROFESSIONAL

PHOSPHORIC ACID and its Byproducts are my specialities; consult me, and you will reduce your costs.—H. T. WATSON, Chemical Engineer, Fairfield Road, Widnes.

WILFRID WYLD, F.C.S.,
Chemical Engineer and Consultant.
31, The Avenue, Roundhay, Leeds.

FINANCIAL

£2,500 CAPITAL REQUIRED to form limited liability company to take over old-established business in picturesque and progressive market town. Qualified CHEMIST with CAPITAL could secure lucrative appointment —Apply "C" care of DEVIZES & WILTSHIRE ADVERTISER, Devizes.

BUSINESS FOR SALE

FOR SALE.—HOUSEHOLD AND GENERAL BUSINESS, splendid oil round and shop trade; grand opportunity to extend business. Turnover £4,000 p.a. Price inclusive £800. Freehold Premises can also be purchased.—Apply HALL, PAIN & GOLDSMITH, Auctioneers and Estate Agents, Petersfield, Hants.

AGENCIES

TRAVELLER, Welsh speaking, calling on grocers in North Wales, would like an additional line; in position to handle any line other than preserves.—Write PUGH, 57, High-street, Portmadoc.

SITUATIONS WANTED

ADVERTISER, now disengaged through slackness, seeks position; excellent experience in control of plants and necessary laboratory and office routine for manufacture and distribution of coal tar products, intermediates and mineral acids; would accept a commercial post in which such experience would be an asset.—Full details from Box 249, CHEMICAL AGE Office, 8, Bouverie Street, E.C. 4.

EX-SERVICE MAN, D.C.M. (27), married, with two years' college training in Chemistry and Physics, desires situation as progress man; able to control labour if necessary, or would accept post as Chemical Laboratory Assistant, &c., or agency for chemicals, &c., having slight practical knowledge of latter. Willing to take any responsible position, preferably chemical. College professors' testimonial.—ALFRED DOUGHTY, University College, Nottingham.

WORKS MANAGER or CHIEF WORKS CHEMIST seeks responsible post. Well qualified and experienced chemist; accustomed to control; ex-Temporary Officer.—Box 251, CHEMICAL AGE Office, 8, Bouverie Street, E.C. 4.

WORKS CHEMIST, 12 years' experience (heavy chemicals), including lay-out and purchase of plant, control of plant and process, seeks position in Works Research Laboratory. Special knowledge of Fuel Economy, Water Treatment and Corrosion of Steam Boilers: also Bacteriology.—Box 250, CHEMICAL AGE Office, 8, Bouverie Street, E.C. 4.

MISCELLANEOUS SALES

ABOUT 3,000 tons of LUMP CUPREOUS SULPHUR ORE for sale; also 800 tons Non-Cupreous Smalls.—Terms and conditions on application to JOHN NICHOLSON & SONS, LTD., Hunslet, Leeds.

CELLULOID ACETONE DOPE, transparent and pigmented, about 800 galls., at 5s. 9d. gall., or near offer for lot. Samples, 1s. 6d.—M. KENZIE & Co., 26-7, Holland Park Mews, W.11.

CELLULOSE ACETATE.—Best make, in bags or casks; 1 ton for disposal. 6s. per lb.—QUICKS, Peckford Place, Brixton, S.W.9.

CHEMICALS AND DYES, all from Stocks.—2½ tons OLEUM 20 per cent., £8 5s.; SODIUM BICARBONATE, refined, £10 10s.; BLACK OXIDE OF IRON, £5 10s.; WASTE SODIUM CARBONATE, £4 per ton; DECOLORISING CARBON, £14 per ton; CAUSTIC SODA, 98 per cent., £28; SODIUM SULPHIDE, 60/62, £23; CRYSTALS, £15. All per ton rails. 480 gallons DARK CRESYLIC, 2s. per gallon; TETRACHLORETHANE, 1s. 6d. British BICHROMATES: SODA, 6d.; POTASH, 9d; RHODAMINE B. (Bayer), 9s. 9d.; RHODAMIN 6G (Bayer), 13s. 3d.; METHYL VIOLET, 2B Extra, 4s. 5d.; MALACHITE GREEN CRYSTALS, 11s. 9d.; LITHOL RED, 1s.; BETA NAPTHOL, 2s. 11d.; PARANITRANILINE, 4s. 3d.; "H" ACID, 6s 6d. 100 per cent.; METANILIC ACID, 3s. 3d. 100 per cent.; DIMETHYLAMINE, 3s. 3d.; BETANAPHTHYLAMINE MONOSULPHONIC ACID (Tobias Acid), 4s. 10d.; ALPHANAPHTHYLAMINE, 2s. 4d.; ANILINE SALT, 1s. 5d. All per lb. delivered. Other Chemicals and Dyes in Stock. Enquiries solicited.—HULSE & Co., Woodlesford. Phone Rothwell, 71. Wires, HULSE, WOODLESFORD.

EPSOM SALTS (Commercial).—Large supplies for sale at low price, for export outside England only.—Apply A. E. ARTHURTON & Co., 14, Dale Street, Liverpool.

FOR IMMEDIATE DELIVERY AT LOW PRICES.—CARBOLIC CRYSTALS 39/40°C. PALE CRESYLIC ACID 97/99 per cent. CARBOLIC LIQUID SOAP. HARD BAR SOAPS. DISINFECTANT FLUIDS. SHEEP DIPS. Prices quoted delivered free including packages to suit buyers. Inquiries esteemed.—DIGGORY & Co., Merchants, 38, Union Street, Liverpool.

PAINT.—5 tons ready-mixed Oil, Green, Red (Venetian and Signal), Yellow and Glossy Brown, 30s. cwt. Oat Sacks, 30 × 24, 4d. each. Twill Sugar Bags, 6d. Jute Twine, 6d. lb.—MCKENZIE & Co., 26 7, Holland Park Mews, W.11.

TOWER PACKING RINGS, 4 in. diameter, round Earthenware Tanks, 75 gallons; Slate Tanks, &c.—Box 247, CHEMICAL AGE Office, 8, Bouverie Street, E.C.4.

ZINC Carbonate for disposal. Enquiries solicited.—BROTHERTON & Co., LTD., Leeds.

MISCELLANEOUS WANTS

CANDLES.—Wanted, 1,500 cases over three months. Price and full particulars. Cash against pro forma invoice, if desired.—Box 252, CHEMICAL AGE Office, 8, Bouverie Street, E.C. 4.

PHOSPHATES.—Waste or cheap material wanted, up to 150 tons weekly. Material must compete with Unbroken Basic Slag containing about 9 per cent. Phosphates, which costs 16s. per ton at Woodlesford. Higher price paid for richer Phosphate contents. Correspondence and enquiries invited.—HULSE & Co., Woodlesford.

WANTED.—Quotations for ARGOL, delivered in bulk lots—with analysis and lowest price.—Box 252, CHEMICAL AGE Office, 8, Bouverie Street, E.C. 4.

WANTED.—TORRANCE MILL, 5 ft. to 6 ft. pan, modern make.—HILLS' PAINT WORKS, Broughton, Manchester.

WANTED.—Radium Salt, Pure or Residues, Old Applicators, &c.—Apply, HARRISON GLEW, Radium Laboratories, 156, Clapham Road, S.W.9.